

YOUTH, SEX, AND LIFE

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FOREWORD

THIS book is written for young people of both sexes and for parents. One of its aims is to encourage an enthusiasm for that health of body and mind that is essential for a full and happy life. As a doctor, I have been appalled at the *preventable* human tragedies resulting from diseased bodies and warped minds. I feel strongly that young people should not be left to blunder along, in ignorance of Nature's laws and of her inexorable penalties which may be long delayed. Apparent immunity over a period of years may lead to a false sense of security. By the time that the immaturity and inexperience of youth have been replaced by the greater knowledge and experience of later years, it may be too late to eradicate the effects of the youthful errors, effects which may lead to anything from patches of general ill-health and inefficiency to a lifetime of misery and wasted possibilities.

An equally important aim of this book is to help young people to get a proper attitude to sex; for the results of ignorance or of a morbid attitude based on wrong information may be either fear and disgust, or else a furtive, gloating interest that is unspeakably nauseating. Of the vital importance of a proper sex education—of correct knowledge of sex and reproduction available *at the right time*—I am firmly convinced.

Sex should take its place in the general scheme of life, and should not be dealt with as an isolated subject in an atmosphere of secrecy and furtiveness and complicated by all kinds of emotional difficulties. The foundations of a proper sex education should be laid in the study of biology—the general structure and development of plant and animal life—at a time before the emotional difficulties of adolescence arise. Here space allows only a brief and inadequate outline of the biological aspect of reproduction—

of the evolution from sex in the most primitive creatures to sex in man himself. I hope, however, that the little I have written will stimulate a desire for a fuller knowledge of the wonders of life. I should like here to express my own indebtedness to the book *The Science of Life*,* and I commend this book to all those who have the time and the interest for a thorough study of this fascinating subject.

Modern life is full of pitfalls, and its difficulties for young people are probably greater than at any other period of the world's history. Youth is the time for high ideals and strong enthusiasms; but without sound knowledge and judgment and self-control the fine ideals and enthusiasms may not avail to prevent catastrophes. Of all the obstacles that stand in the way of human progress and happiness, I believe that ignorance, prejudice, and intolerance are the most potent, and that selfishness and deliberate cruelty are, more often than not, the products of these three. Although the youth of to-day have a more difficult world to face than had the youth of former generations, yet they are able, if they will, to become better equipped for the fray; for never before have there been comparable opportunities to gain the essential knowledge and assistance.

G. M. COX.

* "The Science of Life," by H. G. Wells, Julian Huxley and G. P. Wells.

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YOUTH, SEX, AND LIFE

CHAPTER I

INTRODUCTORY

It is a common failing of middle-aged folk to talk of the "good old days," when young people "knew their places," spoke when they were spoken to, and maintained at least an appearance of respect when their elders deigned to hold forth. It is not surprising that the younger folk to-day feel some impatience with this attitude. When our middle-aged folk themselves were young, they too felt just the same impatience when *their* elders were holding forth about the good old days, and so on and so forth.

It is at least possible that each generation in its turn will continue the process; but it really is a pity, because it leads to a tension between the two generations whereby each is the loser. The experience of older people can still be of value to younger people at times; and the enthusiasms of youth can be an unceasing delight and inspiration to their elders. What is lacking is understanding; and for this lack of understanding I fear that we older folk must take most of the responsibility. If our longer journey through life has taught us nothing more, it should have taught us kindness and sympathy and a certain generosity of spirit which will enable us to recognise quite freely that we are not always right, and that the views of our juniors must be considered with respect and with no suggestion whatever of condescension.

Possibly when life ran more quietly, during those periods when the world was changing very slowly indeed, older folk found it easier to convince their children of the value of their experience; in a way, they had already trodden the very paths that their children were about to

tread. Of late years, however, and particularly during the last quarter of a century, the world has been changing rapidly, and young people are not prepared to give great weight to experience gained in an environment which differed profoundly from that in which they are growing up. Yet there is this point to bear in mind—we are all of us the product of our heredity as well as the product of our environment; and heredity changes but little, and very, very slowly, so that many of the problems of to-day are but the problems of yesterday in an altered setting. Experience is still a guide, although it is not always so complete and exact a guide as it used to be. It is still true that “A wise man learns from his experience; a wiser man from the experience of others.” The experience of one generation is a legacy for the next: some of it may need to be discarded as out of date, the residue may be of infinite value.

Years ago young people were expected to accept the standards and conventions of their parents, simply because they *were* the standards and conventions of their parents; and on the whole they did so, or at least pretended to do so. To-day this is no longer the case, and the change is all for the better. If a standard or convention is sound, it will bear discussion, and can be justified upon reasonable grounds; and once people have reached an age at which reason appeals to them, they are undoubtedly entitled to the reasons for this and that. This, I think, many older people overlook. They may have accepted their standards and conventions without thought in the first place, or they may have forgotten long ago the reasons they once had for accepting them; but it is for them to set to work to discover or re-discover a logical basis, and to support their views with sound reason. It is not sufficient to say, “I am older than you, and I say this.”

I shall have something to say, later on, about the relations of young people with their parents and with other older people. This much I have said so that you may know from the beginning that I am not going to preach at you. I shall give you a good many facts and some advice; but where advice is given, as far as possible the

reasons for that advice will be given so that you may consider it. The aim of this book is to enable you, or at least to help you, to get the most possible out of life.

I have no doubt whatever that far more misery in the world results from ignorance than from intentional viciousness. The highest motives often fail tragically unless they are associated with essential knowledge.

Ignorance might possibly be bliss in a cloister, but for those who have to go out into the world, ignorance is the mother of folly and misery. Perhaps knowledge has never been more necessary than it is to-day. The war and the consequent disorganisation of the world, unemployment and cut-throat competition, the general uncertainty, the inventions of this century—these and other causes have combined to replace the comparative placidity of pre-war days with chaos, in the world of material things and in the world of ideas. Old ideas are challenged in every sphere—sometimes because they no longer hold good, and sometimes simply because they *are* old. To be “advanced” is the fashion; and few pause to reflect that what is labelled “advanced” *may* be merely stupid or even utterly vicious. The old ideas deserve some consideration, since they do represent conclusions founded upon the accumulated experience of the past; before we throw them overboard we should be reasonably sure that we have something better to put into their places.

It is queer what an attraction that word “advanced” has for some people. Many who quite fail to reach the normal level in intelligence or in character successfully hide their deficiencies beneath this magic label. It would be mildly amusing were it not for the fact that numbers of decent and normal people are “taken in”; they are apt positively to wilt at the suggestion that, because they disagree, they are “old-fashioned.” Well, eating and drinking, getting born and living, falling in love and marrying and bringing up children, slogging a ball about, facing up to the world with a stout heart and a cheery countenance—these and many other pleasant and satisfying things are most *frightfully* old-fashioned. It is very long odds that they will go on being old-fashioned, long after

many of these "advanced" ideas are forgotten; for much of the advanced stuff is but froth, while the old-fashioned things are the good, honest liquor beneath.

Please don't think that I am trying to coax you round to the idea that a thing is good *because* it is old-fashioned. What I am urging is that the fact that a thing is old-fashioned is neither here nor there; it may still be perfectly sound, or it may once have been sound but be no longer suited to conditions of life, or it may always have been unsound. I urge, further, that to label an idea "advanced" is to say nothing for it; it may be good, it may be merely silly, or it may be right down rotten. Let us not be intimidated by a word.

It does not follow by any means that an argument is unanswerable, because you cannot at the moment find an answer to it. The skilful conjurer will demonstrate to you that for him the law of gravity does not exist, that empty top-hats give birth to rabbits, and that every joint in his body can lay an egg; but you know all the time that he is deluding you, although you cannot see just how he does it. The skilful advocate will prove that black is white, if it is necessary to do so in the interests of his client; he is so plausible that you cannot resist the suspicion that he has convinced himself; yet, when you listen to his opponent, you find that black is not merely black, but blacker than the darkest night. So it is with some of these brand-new "advanced" ideas. For the moment they may beat you; they seem to be founded upon reason, yet they do not satisfy. Something tells you that there is a catch somewhere, but you can't just put your finger on it. Well, don't let it worry you.

The unimaginative, matter-of-fact sort of youth pays little attention to all this sort of thing, because it bores him stiff; but the more intellectual type of youngster finds it impossible to take this line. He must examine new ideas, because he makes rather a god of reason; so that it is to the intellectual types that new ideas make their great appeal.

Now there is one rough-and-ready way of assessing ideas and codes and standards, and that is to notice *what sort of people advocate them*. If you find that a particular

idea is held by the solid and reliable folk, who get on with the world's work without making a song about it, the folk to whom you could turn with confidence when you had made a first-class mess of everything, and whom you would choose to have with you in a shipwreck or on a desert island, then probably the idea is a reasonably sound one. Unfortunately, these people, who form the salt of the earth, are usually inclined to inarticulateness and embarrassment when it comes to giving reasons for decent behaviour. They just turn up trumps when trouble comes along; and for the rest they get along quietly with the job in hand in a quiet, steady sort of way. In short, they do the proper thing by instinct, because they are the kind of people that they are.

If you find an idea advocated by the shoddy types—the people who must have an audience, who dress queerly and always look as though they could do with a bath, who are “misunderstood,” who cannot credit an opponent with a single decent motive, who don't like exercise and the open air, who are not a good colour in the morning, who are poseurs, whose highest ambition is to grin or glower into a press camera, who are keenly interested in their own emotions and reactions—*then* you will be justified in suspecting that idea. Not all these stigmata will you find in any one person; but you will find some in most of them and their little crowd of pseudo-intellectual followers. There is much to be said for the instinct that prompts us to suspect those who differ much from the normal. They are much more likely to be sub-normal than super-normal; and many of them, knowing this in their inmost hearts, affect to despise the normal. Sour grapes, you know. Amusing and interesting such people may be. Talk with them by all means; brisk discussion is stimulating, even when you “come out by that same door . . .” It takes all sorts to make a world.

A small minority may make a vast amount of noise, and a minority which consists of people to whom the limelight is as the breath of life may seem, to a casual observer, to be leading a world which is, in fact, almost oblivious of their very existence.

To what conclusions does all this lead us ?

Certainly to the conclusion that the time has come when we must put our faith in knowledge and not in ignorance ; that there must be plain, straightforward speaking about the facts of life, including, in their place, the facts of sex.

Then I think that we may conclude that, although the experience of the past is not a complete and infallible guide to the problems of the present, it is nevertheless of considerable value, and should be given some weight. We may conclude, too, that new ideas are not necessarily an advance on old ideas, even though they may be labelled "advanced" ; they must be subjected to the tests—"How are they likely to work out in the long run ?" and "Among what types of people do they claim adherents ?"

The last conclusion is that you to-day, equipped with such knowledge as you may need, must hammer out for yourself your own code. Information will be given in this book, suggestions made, and the pros and cons of debatable points set forth ; but the final decisions on all points must rest with you. Do make decisions. You may alter them later on, in the light of further experience and thought, of course ; but don't just drift along. You want to be something more than a mere reflection of your environment.

Let us imagine that at some date three months ahead you had to ride a spirited horse in a ten-mile race over rough country for a prize of great value. How would you set to work to make the best of your chances ?

You would learn all that you could about your particular horse—how he took his fences and water jumps, whether he revelled in soft going or travelled best "on the top of the ground," what pace suited him best for the distance, and so on. You would give attention to his condition and his training. You would go over the course, and select carefully the line which would suit him best.

You would go into some sort of training yourself, so that you would be carrying no useless weight, and so that you would be alert throughout and have a little in hand for a gruelling finish if need be.

You would, in fact, learn everything that could possibly

be of value to you, and do everything that might increase your prospects of success. You would leave nothing to chance that could be covered by foresight. Now let us apply all this. The spirited horse is yourself—your powers, and energy, strong and weak points ; the rider is also yourself—your mind, your will. The course is your early life ; the fences and dykes and bogs are the difficulties and dangers which you must either surmount or avoid. The prize ? Well, the prize also is life—a long and happy life. A bit mixed, perhaps, but it points a moral with which to finish.

The moral is that no sensible person will intentionally face life without knowing all that he possibly can about its possibilities and its problems, without knowing himself as well as he possibly can, and without some sort of plan in his mind.

CHAPTER II

PHYSICAL FITNESS

"It is the common and universal experience that life is crippled or curtailed by the occurrence of disease, which leads to a greater or less degree of disablement, incapacity and premature death. To prevent or avoid such disease is to lengthen the period of life and make it happier and more effective"—SIR GEORGE NEWMAN, Chief Medical Officer to the Ministry of Health.

YOUR GREATEST TREASURE

"What has all this to do with me?" you may say. "I am perfectly fit, so I'll just skip this chapter." Before you do this, are you quite sure that you are going to *remain* fit for years and years and years? Are you observing the laws of health, and are you forming those habits without which your good health will slowly, but none the less surely, depart from you? Youth takes health for granted. It is only those who have lost their health who really value it; and then, if the damage be too great, it is too late.

It seems to be a fact that some particularly tough and lucky individuals can disregard many of the rules of health with impunity; but believe me, they are rare exceptions. Are you going to gamble upon being one of these exceptions? Before you decide to take the risk, reflect that by the time you have discovered that you have been in error it will be too late to remedy it. You can buy a new car, but no magic will provide you with a new body.

What I want to make plain to you here is that for 99 per cent. of you health won't *just happen* to you throughout life; the price of health is the observance of the laws of health. Just consider what it would mean to you now, if you had to drop out of all active pursuits because your wind had failed, or because your overstrained heart made itself evident by extreme exhaustion after any great physical effort. It will come almost as hard, if this is to

be your fate in ten or fifteen years' time. I hope you'll agree, then, that this chapter does concern you, even though you now glory in the health and energy of youth.

Good health and fitness are priceless possessions; with them, most things are possible; without them, life is apt to be a dreary failure. Herophilos, the Greek philosopher and physician, said that "Science and Art have equally nothing to show, Strength is incapable of effort, Wealth useless, Eloquence powerless, *if health be wanting*." There are many wealthy people to-day who would gladly exchange all their riches for health; they have learnt that without it all else becomes as dust and ashes. It is said that by the age of forty a man is either a fool or a physician; that is to say, that unless a man is a fool, by the age of forty he knows what suits him and what doesn't, and acts accordingly. But why take half your life to learn what suits you? Surely the age to learn this should be much nearer fourteen than forty. The truly wise man will *avoid* ill-health; he will not have to bother about curing it. Those who have formed healthy habits *during youth* will be enjoying life at forty, without having to give thought or undue attention to their physical processes. You will have no need to coddle or to doctor yourself when you are forty if you develop a health conscience now.

What do I mean by a "health conscience"? A health conscience is a willing acceptance of the view that to disregard the laws of health, to fail to cherish your health, is a folly and a crime against yourself, your family and associates, the children who may be born to you, and the nation. The great danger against which I want to warn you now is this—because in youth the body is capable of astounding physical and mental efforts and because its powers of recovery are extraordinarily great, you may be deluded into imagining that you are one of those few exceptional individuals who seem to be able to disregard all the rules of health without paying the price. Understand clearly that, although Nature may allow you to run a long account, sooner or later she will almost inevitably present the bill, and that you will have to foot that bill. Many people are indignant, and clamour for sympathy,

when in middle age they are beset by those chronic maladies that make life a burden, although they themselves have sown in youth the seeds that are now bearing fruit. If the seeds were sown in ignorance, then these people are entitled to sympathy; but if they broke the laws of health knowingly and deliberately, then they deserve nothing but censure. They are punishing themselves, but they are also punishing their families and all who are brought into contact with them. Nowadays no one need remain ignorant of the simple rules whereby health is retained.

If you would like to gather some conception of the prevalence of ill-health to-day, look through the advertisements of any magazine, and note the number of patent medicine vendors who advertise cures for those chronic maladies to which I have referred. The thousands of purchasers, who make these advertisements pay their cost, are probably middle-aged and elderly people who, like you, once gloried in the perfect health of youth. Doctors in their consulting rooms see such people in their thousands, and they know full well that 90 per cent. of their ailments need never have overtaken them. The Great War revealed, to the intense astonishment of most, that a vast number of our people are C3.

Sir Herbert Barker has said, "The tragedy of most men's physical lives is this. They sow the seeds of decay and disease in youth, and spend the balance of their days striving, generally vainly, to undo the mischief done through ignorance and folly."

Without making yourself a martyr, without denying yourself any real happiness and fun, you can prevent this tragedy from happening to you. An occasional "binge" won't hurt you; an occasional late night won't shake your nerves, nor an occasional meal-between-meals ruin your digestion. It is regular and persistent excesses—bad habits—that exact such terrible penalties.

Fortunately it is almost as easy to form good habits as it is to form bad ones—not quite, perhaps, but nearly; and once these good habits are formed, they are quite as strong as bad ones. If you use just a little common sense and a little self-discipline now, and equip yourself with

good habits, you will not have to spend your later life envying those more fortunate or wiser individuals who are wearing better than you are.

I am going to warn you here, and I shall remind you several times, that you must not be misled by the rare, exceptional case. There *are* exceptional cases; but for every one who persistently disregards a rule of health with impunity, there are ten thousand who suffer bitterly from similar disregard. These exceptional cases are "not evidence."

THE RIGHT ATTITUDE TO HEALTH

There is no necessary connection between possessing a health conscience and becoming a health crank, a misery to yourself and an affliction and a bore to those around you. The health enthusiast who lacks a sense of proportion is the butt of the humorist. He is ridiculed as a queer-looking individual who feeds on raisins, monkey-nuts and lemon juice, and snaps almost savagely at a lettuce to capture the daily vitamin. These misguided folk are actually very rare; they could be entirely ignored were it not for the harm they do by creating a prejudice against *reasonable* attention to the maintenance of health. Young people are particularly afraid of ridicule, and therefore many of them, for fear that they should be labelled cranks, hesitate to consider health unless the necessity is forced upon them by a breakdown; but long before the breakdown comes, they have lost a good deal of their spring and "go," and a good deal of the joy of living.

The really healthy person is practically unconscious of his physical processes, he doesn't have to worry about his digestion or the state of his liver, or whether he is losing weight or becoming anæmic. He can eat and enjoy plain wholesome food with the zest of a healthy appetite, and without having to give a thought to the capability of his digestive juices to deal with it.

If you develop a health conscience and form the habit of observing the laws of health, you will automatically keep yourself fit, and you will be—as you should be—unconscious of the working of your internal organs, it

would be almost true to say that if you *are* conscious of one of your internal organs, there is something wrong with it. You do not need to be unduly interested in your body if it is running properly, it is only when you have lost your health that you are in danger of becoming a health crank

THE HUMAN MACHINE

No doubt you admire the Bluebird racing car and the seaplanes that won the Schneider Cup for us, and the radio sets that are among the marvels of this age. Do you realise that the bodies of the men who invented these wonders, of the men who made them, of the men who pilot them, and of you yourself, are far more wonderful and intricate than any of these mechanical things? Compared with the human body, the most powerful locomotive, the swiftest car or 'plane, or anything else that you like to mention, is but a clumsy toy. Fifty years ago Sir James Paget, a great British surgeon, said :

“ The living human body is, surely, the most complex mass of matter in the known world. In composition it surpasses the highest powers of chemical analysis ; in mechanism it is far beyond the calculations of the physicist, its structures are but dimly seen with even the most perfect microscope, all the known forces of nature are constantly and coincidently at work within it ; through circulating blood and a nervous system every part is in swift communication with all the rest ; and it includes the apparatus of a mind from whose influence no portion of its matter is distantly removed.”

To mention just a few of the ways in which your body is more wonderful than any machine—it can grow, it can repair itself while it is still working, it can reproduce itself, it can think ; and by thinking it has evolved all those very machines at which we marvel.

This finely adjusted physiological instrument must not be injured and wasted by ignorant or wilful misuses. To get the best service from the human machine, just as from any other machine, it is necessary to understand something

of how it works. Virgil wrote, "Happy is the man who has attained to the knowledge of the causes of things." Hundreds of years later, St. Augustine added, "There are none which it concerns us more to know than those which affect our health." Without knowledge you may unwittingly mishandle your body too much or too often, as modern civilisation invites you to do, so that it becomes damaged beyond repair or can be repaired only slowly and at the cost of great suffering. You must supply a machine with the right kind and the right amount of fuel, you must keep it cleaned and oiled, *and use it reasonably* so that it neither rusts out nor rattles itself to pieces. You must supply sufficient air for the combustion of the fuel, and you must remove the waste products so that it may not become clogged.

MODERATION

To get the best out of the body-machine, you need suitable food (eaten in the right quantities and at the right times), fresh air, exercise, rest, and cleanliness within and without. There is no single golden rule of health, but *moderation* is the key-note of all of them. Sunshine is good for health, but you can burn your body by undue exposure to the sun just as surely as though you stood too close to a fire. Without exercise you cannot keep fit; but too much exercise will send you stale, and prolonged violent efforts may strain your heart muscle and damage it permanently. Swimming is an excellent exercise; but if you stay too long in the swimming bath, you may get a chill and develop pneumonia. However good your diet, you may damage your digestive organs by over-eating, I have heard it said that "Most of us dig our graves with our teeth." A glass of beer or a cigarette will do no harm whatever, but immoderation in either alcohol or tobacco will have regrettable consequences. So it is with all the good things of life—enough is *better than a feast*!

HEALTH MEANS HAPPINESS

Most of you have experienced those glorious days when you leap out of bed, upset the older members of the

household with your vocal efforts, and with difficulty restrain yourself from thumping the "old man" on the back and telling him to buck up—those days when you are quite sure that the world is a jolly fine place to live in. You have probably also experienced "off days," when everything was an awful fag, when you loathed any one who sang in the morning, when, in short, you hated the whole world. The world is exactly the same place on all these days; it is you who are two different persons—yourself in health and yourself rather "under the weather."

Is life worth living? You have probably heard the reply—"It depends on the liver." It hardly matters which way you interpret the answer; either way it tells the truth. It is never too early to realise the power of the body over the mind and feelings. Health brings with it sheer joy of just being alive; but it also gives keener interest and efficiency in work and play and higher courage to face difficulties and dangers.

The relation between health and happiness has been noticed almost since the dawn of history. Hippocrates, the Greek physician who is known as "the father of medicine," dreamed of a world free from sickness and pain. He practised his art, not in gloomy consulting rooms or barrack-like hospitals, but in the great Health Temple of Cos, set in beautiful surroundings of sea, mountains and fertile plains. Sun and air bathing, water used freely internally and externally, clean natural diet, gymnastic exercises and athletic contests enabled the Greeks to reach a standard of physical perfection which has never been surpassed.

HEALTH AND BEAUTY

It is natural and proper to wish to be beautiful and attractive. Fortunately we do not need classical features and perfect proportions in order to be beautiful, or beauty in human beings would be far rarer than it is. The most attractive people I know have neither regular features nor commanding stature; but they have clear skins glowing with healthy colour, bright eyes and the happy and contented expressions that go with perfect health—they look

fit. The laws of health might well serve also as the laws of beauty—good food, effective excretion of waste matter, cleanliness, fresh air and sunshine, exercise and rest. I am sometimes shocked at the loss of beauty that results from a period of chronic ill-health—not an acute illness, but the state of being below par which may result from over-eating, unsuitable food, lack of fresh air, exercise or sleep, or from constipation. How often do we see perfect features rendered unattractive by a sallow, pimply complexion, lack-lustre eyes, by a peevish depressed expression and other outward signs of the poisons within! How many a pretty girl loses all charm because of the lack of spring in her walk, her rounded shoulders and flat chest, all of which may result from neglect of fresh air and exercise, from poor nutrition, over-fatigue, or want of sleep!

Each age commits its own sins against beauty. Are you, through thoughtlessness or ignorance, slowly but surely ruining your appearance? Marv in her teens gradually loses "that schoolgirl complexion" and her teeth begin to decay; she probably fails to associate her losses with her habit of eating sweets and biscuits between meals. Helen does not appreciate that her rounded shoulders and frowning brows are the result of too much crouching over novels and reading in a bad light and neglecting to take sufficient air and exercise. Phyllis, the tennis enthusiast, has her former beauty marred by the tired strained look that is due to her weakness for "just one more set" when she is already tired. George, who consumes four square meals a day, is shocked at the increasing sallowness and spottiness of his face, and at the threat of double chins front and back; he is more concerned about the loss of looks than about the headaches and fits of depression and irritability which are but additional symptoms of the trouble he has brought upon himself by his greediness.

During youth, energy and high spirits tempt you to burn the candle at both ends, and so you may sacrifice rest and sleep. Now rest is Nature's remedy for fatigue. Sleep is a great bringer of beauty; it smooths away frowns and banishes that tense expression that tells of over-fatigue.

If you persistently rob yourself of sleep, you must expect to pay the price for this foolishness, and you will pay it in beauty as well as in health. Those men and women who lead a gay night life and yet manage to retain their health are the favoured few who do not have to turn out in the morning to face a job of work. Often enough the appearance of health is but the work of some beauty specialist, who hides the real face under a mask of cosmetics. If you have to earn a living, you simply cannot afford to turn night into day, except perhaps just once now and then

CHAPTER III

PHYSIOLOGY AND HEALTH

HOW YOUR BODY WORKS

Physiology.—Physiology, the science of the working of the body, reveals a most marvellous and fascinating story; and it is worth while to consider, just in brief outline, this true story of "how the wheels go round," in order to understand the reasons which underlie the health rules. As a matter of fact, if you have a sound knowledge of physiology, you can deduce many of the rules of health for yourself; and this is very much more satisfactory than learning a list of rules without knowing why they are sound rules, and a list of "Thou shalt not's" without understanding the reasons for the prohibitions.

The cell-citizens.—Your body has been compared to a nation consisting of millions of tiny citizens (the body cells), each carrying on its own special work, but co-operating faithfully in the general scheme. Some are members of the central government which is in control of the whole nation; some are members of local committees in charge of certain jobs. There are chemists and messengers, scavengers and transport workers; and there are members of the army of defence. Building and repair works are undertaken. During periods of good health, all these tiny citizens are working together happily and harmoniously, and the nation flourishes. In disease, the harmony is broken and the nation is imperilled. There may be attacks from without; in this case the defence organisation comes into action. Sometimes the trouble comes from within; some of the citizens, because they are ill-nourished, overworked or otherwise ill-treated, go "on strike" and refuse to do their jobs; they may even attack their neighbours.

Growth and repair.—The cells of which your body is composed are essentially microscopic particles of the living,

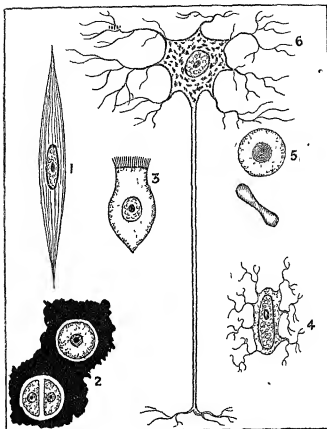


DIAGRAM OF CELLS. (Highly magnified.)

- 1 Muscle cell.
- 2 Cartilage cells, embedded in cartilage
- 3 Cell with hair-like processes (cilia) from air-pipe.
4. Bone cell
- 5 Red blood cells (one end on to show disc shape with concave surfaces)
- 6 Nerve cell from brain. (Drawn to scale, the main branch would be more than a hundred times the length here shown)

plicated mammal of all—man. I can assure you that all of this makes most interesting reading ; perhaps you will read it for yourself in some book on biology.

Your body needs, then, a food supply ; chemical laboratories to prepare the food so that you can make use of it ; a transport system to distribute the prepared food to every part of the body ; and a scavenging system to clear away all the waste products that are always being produced. The fuel and the repair and growth material are extracted from your digested food, which is carried round the body by your blood ; the oxygen, which is needed to combine with the fuel to produce energy, comes from the air you breathe, and it also is carried round the body by your blood ; and all the refuse or waste material is carried away from the cells by the blood to the parts of the body where it may be extracted and excreted.

Digestion.—The raw material of your body's food supply is the food you eat ; but that raw material cannot be utilised unless and until it has undergone physical and chemical changes in the body's factories—you cannot, for instance, supply your body's iron requirements by swallowing iron filings, for there is no organ which is able to convert the iron into such a form that you can make use of it. Your system of digestive factories or organs undertakes for you this important work of rendering your raw material suitable for use ; it makes, from the masses of food that you eat, the living bricks and tiles, wood and glass for the building and repair of your human house ; and it makes also the right kind of fuel to warm that house and the right kind of fuel to supply the energy to " run " it.

A " balanced " diet.—The most perfect and healthy digestive system cannot function properly *unless you supply it with the right kinds of food*. A house cannot be well and truly built if there is insufficient mortar, even though there may be enough and to spare of bricks ; and so it is with your body—if you lack certain essential foods, you will not thrive, even though you have an ample supply of other food material. We use the term " a balanced diet " for a diet which is lacking in none of the essentials.

Here I will outline briefly what represents a balanced

diet. To maintain health, your daily diet should include some foods from each of the following groups

1. Body-builders and repairers (proteins).
2. Fuel foods (fats and starches and sugars).
3. Minerals.
4. Vitamins.
5. Roughage.
6. Water.

Most foods contain several of these constituents, some contain all, in varying proportions ; but we can classify them according to the constituents which form the main bulk of the particular food or for which the food is of special use in the diet. Thus we have :

Proteins (body-builders and repairers).

Animal origin : meat, liver, heart, fish, milk, cheese, egg-white.

Vegetable origin . peas, beans, lentils, nuts, oatmeal.

Carbohydrates (fuel foods).

Starches : bread, cereals, biscuits, cakes, potatoes, bananas, rice, sago, tapioca, macaroni.

Sugars : sugar, sweets, honey, golden syrup, jams, marmalade, chocolate.

Fats (fuel foods).

Butter, cream, dripping, margarine, fat meat, bacon fat, olive and other oils, nut butters.

Minerals (needed for growth and repair, for the red blood cells, for the formation of bones and teeth, for the stomach digestive juice, and for the functioning of the heart, etc.).

Of the ten minerals essential to health, there are two which are most likely to be deficient in modern diets : these are calcium and iron.

Foods which are the chief source of minerals are : milk, *wholemeal* bread, *whole-grain* cereals, green and root vegetables (if properly cooked), fruits (including jams and marmalade), meat and fish.

Calcium is found chiefly in milk and leafy vegetables.

Iron is found chiefly in liver, spinach, cabbage, and egg-yolk.

Vitamins

These substances can no longer be dismissed as mere fads of the "food cranks," for in addition to the conclusive evidence of their existence and vital importance from feeding experiments and from dietetic treatment of certain diseases, three of them have now been isolated in a pure state. At least six of these elusive substances have been clearly distinguished. Although only very minute quantities are needed, complete absence from the diet of any one of them will cause death in from three to six months. Fortunately, they are fairly widely distributed in natural foods; but, unfortunately, some of them are removed or destroyed in the manufacturing processes of modern times or in bad methods of cooking and of preparing foods. A deficiency of any one of those mentioned below causes definite ill-health.

"Deficiency diseases."—In the old days of sailing ships, when it was impossible to provide fresh foods for weeks and months on end, whole crews would fall sick and thousands of sailors died through the lack of certain food elements (vitamins), although there was no shortage of other food materials. Even so recently as the Great War, there were outbreaks of illness among the troops owing to their having an unbalanced diet. Diseases due to this cause are known as "deficiency diseases"; they are still common in some parts of the world to-day; and in our own country, numbers of our own people have their health impaired owing to their unbalanced diet, though they do not develop the deficiency diseases in a grave form.

Vitamin A, which increases resistance to infection, is found in animal fats (except lard) and in green salads and vegetables, carrots and tomatoes.

Vitamin D, the rickets-preventing vitamin which is concerned with the healthy formation of bones and teeth and of the proper functioning of the muscles, occurs, together with vitamin A, in most animal fats.

Foods particularly rich in A and D are cod and other fish liver oils, liver, fish roe, egg-yolk.

Vitamin B, which promotes the nutrition of the nerves, is found in the seeds of plants and in the eggs and internal organs of animals, such as yeast and yeast extract, wheat germ, bran, peanuts, peas, beans, lentils, nuts, egg-yolk, hard roe, liver, heart, kidney, *wholemeal* bread and *whole-grain* cereals.

Modern methods of milling to produce white flour and "refined" cereals remove a large proportion of the vitamin B and of the mineral matter.

Vitamin G (or B₂), which promotes the assimilation of the protein foods and therefore influences growth, is found, together with vitamin B, in yeast products, lean meat, pig liver, fish, and egg-white.

Vitamin C, which promotes the health of the blood and blood-vessels and of the teeth, and protects against the disease scurvy, is found in oranges, lemons, grape-fruit, tomatoes and raw greenstuff, and to a less extent in swedes, potatoes, and other fruits

This vitamin is destroyed by prolonged cooking, or by cooking for a short time with bicarbonate of soda in the water in which the food is boiled—a common method of cooking green vegetables "to improve the colour." The colour of the vegetables is improved at the expense of the colour of the skin of those who eat such damaged foods.

Vitamin C is not destroyed by modern methods of canning.

Water

About four pints of water (including that taken as tea, coffee, and other drinks) should be taken each day, in addition to the water which is present in all solid foods. Some foods contain a large proportion of water; juicy fruits, melon, vegetable marrow, cucumber, cabbage, and milk contain 90 per cent. of water, and potatoes over 80 per cent. of water.

It is a good health habit to take a glass of water (hot or cold, as preferred) first thing in the morning and last thing at night, and about an hour before meals.

If you have a good mixed diet including milk (at least a pint a day) and dairy produce, eggs, meat, fish, liver, wholemeal bread and whole-grain cereals, cabbage, spinach and other green vegetables, watercress, lettuce and other green salad foods, tomatoes, oranges, lemons, grape-fruit and other fruits, you will be in no danger of having an unbalanced diet.

HOW THE BODY DEALS WITH FOOD

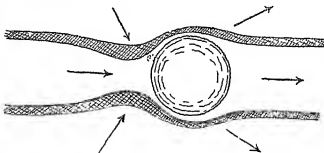
Digestion begins in the mouth

Mastication.—In the mouth, the food is thoroughly broken up and crushed to a pulp ; and during this process it becomes mixed with saliva, a digestive juice which gets to work on the starchy parts of the food (bread, cereals, potatoes, etc.). Starch cannot be utilised by the body until it has been changed into a form of sugar. There is not time for the saliva to deal with the whole of the starch ; some of it has to wait until later on, after it has passed through the stomach. If we are really hungry and see—or even think about—some appetising food, the saliva begins to pour out from the glands where it is made, and we say that our mouths “water.” The more thoroughly we chew our food, the better we shall digest it, there will be less unchanged starch to be dealt with later on, and the stomach juices will be the better able to reach every part of the food if it has first been thoroughly pulverised. The teeth and gums benefit if we chew well ; the exercise promotes a better circulation of the blood in the gums and teeth ; and the increased flow of saliva, which is alkaline, protects the enamel of the teeth from erosion by acid foods. You will understand, then, why you are recommended to masticate well instead of “bolting,” and why fairly hard, dry foods are better than “slops.”

Swallowing.—The food is pushed by the tongue to the back of the throat and swallowed ; it makes its way down the food-pipe, which passes through the neck and chest to the stomach. Certain muscles and a cleverly arranged little flap in the throat prevent the food from “going the wrong way” ; otherwise some of it might

pass into the air-pipe leading to the lungs. Sometimes a crumb does get into the air-pipe, and we dislodge it by coughing.

If you reflect that you can swallow when you are lying down, and even when your head is lower than your stomach, you will realise that the food does not just drop into the stomach. It is forced along by the muscles of the food-pipe. The muscles dilate the tube in front of the ball of food, and contract it behind, so that a wave of dilation followed by contraction passes down the tube. You can imitate this very well by squeezing a large ball down inside a stocking with your hands



The contents of the food-pipe are moved along by a wave of dilation in front of the mass and a wave of contraction behind it

Digestion in the stomach

Gastric digestion.—The stomach is a sac-like enlargement of the digestive tube which passes from the mouth to the opening of the lower bowel. In it the food is churned about and mixed with more digestive juices, which contain hydrochloric acid, pepsin and other ferments which flow from thousands of tiny glands in the stomach. The digestion of the proteins (meat, fish, egg-white, the casein of milk and cheese, and other body-building and body-repairing foods) begins; the outer walls of fat cells are dissolved, and most of the living germs, which have been swallowed with the food, are killed by the acid.

Some mothers are worried because the milk, which their babies vomit after a feed, is curdled—I have often been told that they fear that the food doesn't suit the child because of this curdling. I am able to assure them that this curdling is a natural and essential process; the milk is acted upon by a special ferment in the stomach, which "curdles" it in preparation for further digestion.

The stomach should have emptied itself in three or four hours after an ordinary mixed meal. Some foods take longer than others for stomach digestion; roast pork, for instance, may take five hours to digest, whereas tripe will take one hour. If you know that you have to go a long time before your next meal, you can save yourself from the pangs of hunger by eating foods which take a long time to digest before your fasting period begins.

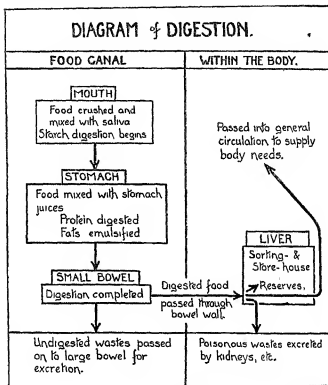
Digestion is completed in the small bowel

Bowel digestion.—When gastric digestion is completed, the lower opening of the stomach opens and allows the contents to pass into the small bowel, where digestion is completed. More digestive juices are mixed with the food in the upper part of the small bowel—some coming from the liver, some from the pancreas and some from the lining of the bowel itself. The starch and sugar food (bread, potatoes, jam, honey, etc.) are changed into glucose—a special kind of sugar; the fats (fat meat, butter, cream, etc.) are changed into a kind of soap (the "soap" is changed back into fat again as soon as it has passed through into the blood); the proteins (meat, fish, egg-white, etc.) are changed into an acid substance.

Absorption.—The digested food is now ready for the body's use, and it passes into the circulation by way of the blood-vessels of the bowel wall. I trust that it has become quite clear that you will not necessarily be properly nourished because you eat a lot of good food; it is not the food that you put into your stomach that nourishes the body, but the amount that is digested and passed into the blood.

Over-eating.—Some heavy eaters suffer from malnutrition, because impaired digestive functions (known as

"indigestion," "gastritis," "dyspepsia," etc.) prevent the absorption through the bowel wall of sufficient nourishment for health. An over-fed baby, for instance, after



The food canal is a continuous tube passing through the body from the mouth to the lower end of the bowel (rectum). This canal varies in size at different parts, and is largest where it dilates to form the stomach pouch. Food must first be digested and then absorbed through part of the canal wall to enter the circulating blood; and until it is digested and absorbed it is of no use to the body for nourishment. Our nutrition depends, then, upon our digestive powers as well as upon the food we eat. If digestion is impaired, we may suffer from malnutrition, however generous the diet. When the digestion is not working properly (during illness, exhaustion, or great emotion) we should choose light and easily digested meals, and not burden our digestive system with unsuitable large meals with which it is incapable of dealing.

gaining heavily in weight for a time, may develop indigestion and begin to waste, although the heavy feeding is continued.

Waste.—The residue of the food, which remains after the useful parts have been extracted, is passed on to the lower bowel to be excreted.

Intervals between meals.—It is interesting to know that such chemical processes take place during digestion, but it is much more important for your health that you should *realise that the digestion works in a certain rhythm and that your digestive organs should have periods of rest*. Without proper rest they will not continue indefinitely to work efficiently, and in middle age or later you will become a martyr to chronic indigestion. The glands which produce the digestive juices empty themselves and then require a spell of rest while they store up materials for the next digestive effort; the muscles of the stomach and bowel need periods of rest between their efforts, just as do the muscles of your arms and legs. If you were baking a cake, and every few minutes you took it out of the oven to add a little more of the various constituents, you would not expect to get a good result. You must not be surprised that you develop indigestion if you are continually interrupting the digestive rhythm by eating between meals, calling upon the glands to secrete before they have had time to recuperate, and not allowing the muscles of the stomach and bowel reasonable periods of rest. Remember that quite a tiny snack, such as a few biscuits or chocolates or a cream ice, must be counted as a meal between meals! Nature would be far kinder to you if each time you ill-treated your digestive apparatus she saw to it that you "frowed up," as did Mummy's darling at the party. Unfortunately, the effects are usually cumulative, and it may be months or even years before the evil effects manifest themselves—and by that time the damage may well be beyond complete repair. I believe that there is more injury to health caused by over-eating, irregular eating, and from eating the wrong kinds of food, than by the consumption of alcohol and tobacco. *Many people dig their graves with their teeth.*

How the food is used in the body

Distribution of the food.—The digested food is absorbed from the bowel into the bloodstream, and, after being thoroughly sorted out in the liver, is distributed through the body.

Excess of fat.—Surplus fat is stored under the skin and in the "fat depots." A certain reserve of fat (more in women than in men) is compatible with good health; but an excess of fat is a menace, for it will invade the tissues, including the muscles; *and a fatty muscle is inevitably a weakened muscle.* If, through over-eating you allow yourself to become fat, the loss of your figure, though regrettable, will be of far less account than the damage to your heart muscle through the infiltration of fat; the earliest penalty of this may be that you have to give up games, sport and even hiking because your breathlessness slows you down and you become easily fatigued. I may mention here that a proportion of the cases of obesity, especially in women, are due *not* to over-eating, but to some derangement of the endocrine glands (commonly but incorrectly known as the "ductless glands"); these unfortunate people are frequently very small eaters.

A proportion of the sugar is stored in the liver and muscles, to be released into the bloodstream as it is required.

Excess of protein.—The protein, or body-building food, is not stored in the body unchanged. If more is absorbed into the bloodstream than is needed for the immediate requirements of the tissue, the excess must be changed and split up in the liver; part of it becomes available, together with the sugar and fat, for fuel purposes, or may even be stored as fat; the remainder is excreted by the liver and kidneys as waste. If, therefore, you take excess of protein (meat, fish, white of egg, cheese, protein of milk, peas, beans, lentils) you are overworking your liver and kidneys.

Why oxygen is necessary to life

Oxygen.—Food possesses potential energy, just as does coal or petrol; combustion (burning) with oxygen is

necessary in order to release that energy. Food plus oxygen together provide the source of the energy (vital energy, heat energy, chemical and mechanical energy) possessed by the living body.

Oxygen must be carried to each cell and liberated there, so that the energy of the food may become available. Now, if oxygen gas just bubbled along in the bloodstream there would be grave danger of bubbles lodging in the tiny blood-vessels, and other drawbacks; it must be carried in some other manner. As it is but slightly soluble in water or in the fluid part of the blood, there is need for a special substance which will combine with oxygen freely *at the atmospheric pressure* (and so take it from the air which we breathe into the lungs) and release it *at the lower pressure* in the tissues, where it is to take its part in the body metabolism (chemical changes in the body protoplasm). The solvent which fulfils these requirements is a pigment called hæmoglobin; this pigment is present in the red blood cells and gives the blood its red colour. By means of this wonderful pigment, the blood is enabled to carry about thirty times as much oxygen as could be dissolved in the blood fluid alone. Hæmoglobin, by the way, is remarkably similar to the green pigment (chlorophyll) of plants, except that the latter contains magnesium instead of the iron of the former. People who suffer from anæmia have an insufficient supply of hæmoglobin in their blood; and they are, therefore, unable to carry round sufficient oxygen for the needs of the body.

The exchange of gases

Oxygen and carbon dioxide.—The air passages of the lungs divide and subdivide, like the branches and twigs of a large shrub; the smallest twigs end in tiny air-sacs, which are rather like bunches of grapes—except that they all communicate with one another and all open into the “tube-stem” by a common opening. The walls of the air-sacs are formed of an exceedingly fine membrane through which interchange of gases (oxygen and carbon dioxide) can occur. They are all surrounded by a dense network of tiny blood-vessels; and the walls of these blood-

vessels also are so thin that they permit the interchange of gases to take place through them.

The object of this complicated arrangement is to provide, within the small space available in the chest, a sufficiently large surface for the interchange of gases between the blood and the inspired air. The total surface of the inside of the lungs is about equal to the floor surface of a hall twelve yards by ten yards.

From the air-sacs of the lungs, then, the oxygen from the air passes into solution in the blood fluid, and then combines with the hæmoglobin of the red cells, while, at the same time, the gaseous body "waste" (carbon dioxide) passes out of solution in the blood and into the air in the air-sacs, whence it is breathed out.

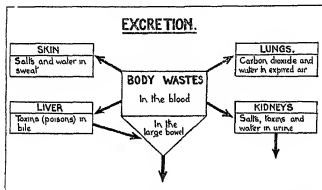
"Fugging."—It used to be thought that the ill effects of the stuffy atmosphere of a badly ventilated occupied room were due to insufficiency of oxygen, but we now know that this is not the case; there is sufficient oxygen for our needs in a crowded hall if we use our lungs fully and breathe deeply. I hasten to add that there are *other grave objections* to passing time in badly ventilated and crowded rooms, for, along with the diminution of oxygen and increase of carbon dioxide, there are harmful changes in the air of the room—changes of temperature and of moisture content.

During vigorous exercise we use up more fuel food, and therefore require extra oxygen for combustion, and so we breathe more quickly and more deeply.

We must have an adequate supply of this life-giving gas if our body fires are to burn brightly and clearly. We must, therefore, keep our respiratory system—the lungs, air passages and red blood cells in good working order, and use them well. In breathing, as in other things, you should make a good start; so breathe in through the nose—it acts as a filter against dust and germs, and it moistens and warms the air before it passes into the lungs. Those who lead sedentary lives in offices, shops, etc., should form the habit of taking a dozen slow, deep breaths, in front of an open window before breakfast, and in the open air at odd times during the day.

The body's scavenging system

Excretion of "waste."—In the Middle Ages there were no proper drains or sewers, and no organised collection and disposal of refuse. The household "rubbish" was simply cast out into the street to lie about in evil-smelling heaps, and provide happy hunting-grounds for rats, dogs, and pigs. The community was poisoned by its waste products; disease and early death were the order of things. Now that we have our public health services, our waste is collected and properly dealt with, and our streets



are clean, the standard of health has improved enormously, and with it our expectation of life.

The body, like a nation, has its waste products, which must be eliminated if they are not to accumulate and become poisonous; to deal with these waste products the body has its own scavenging and sewage systems.

The living substance of which the body cells are composed is in a continual state of activity, building up and breaking down; and the waste products of this "wear and tear" are passed into the bloodstream and removed from the blood as it passes through the "excretory organs"—the lungs, kidneys, and skin—which are responsible for eliminating them from the body. When the fuel foods are burnt up with oxygen in the tissues, an acid gas (carbon

dioxide) is formed ; this is collected up in solution in the blood, and excreted through the lungs in the air we exhale.

Excretory organs.—The tissue waste, the refuse of the building up and breaking down, is removed from the body by the skin, by the kidneys, by the action of the bowel, and in the expired air.

Some waste products are filtered off in the liver and drained out into the bile, to be excreted from the body with the waste food materials from the bowel. By the two kidneys, which are filters composed of masses of tiny tubes and specialised cells, waste products are removed from the blood as it passes through them and excreted in the urine ; when the kidneys are working properly, the composition of the blood is kept remarkably constant. Other wastes are drained from the blood through the sweat glands of the skin—there are about five hundred openings (pores) of these sweat glands in a square inch of skin.

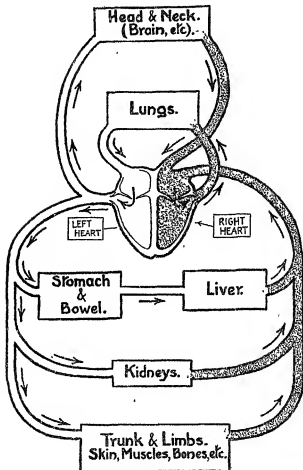
Deductions.—From this account you will be able to deduce the necessity for avoiding over-working the excretory organs through over-eating, for regular action of the bowel ; for keeping the skin clean and active ; for deep breathing and fresh air ; and for water drinking. The body sewers must be kept clean and well flushed.

How the blood circulates

Transport.—We have mentioned some of the important work to be done by the blood—the transport of food and oxygen, the collection of waste. This work must be done continuously ; any cessation would entail death. The blood, then, must be kept moving along in its proper channels.

The heart is the powerful double pump which keeps the blood on the move ; one pump sends the blood through the lungs to pick up oxygen and get rid of carbon dioxide ; the other pump sends the blood circulating through the whole of the body (including the heart itself), carrying food and oxygen to the tissues and removing their waste products to the excretory organs.

The heart beats rhythmically throughout life ; but it beats more slowly and less vigorously when you are



CIRCULATION OF BLOOD (viewed from the back).

1. The right heart pumps blood to the lungs, to pick up oxygen and to excrete carbon dioxide (*pulmonary circulation*)
2. The left heart pumps blood throughout the body, to carry food and oxygen to the tissues and to remove—from the tissues to the excretory organs—the waste products (*systemic circulation*)

resting or sleeping than it does when you are awake and active. The heart rests between beats, and a comparison of the resting phase and the working phase shows that the heart puts in about an eight-hour day. You can give your heart extra rest by giving it less work to do; the greatest degree of rest is given when you are lying down asleep, with all the body functions damped down. The heart has less to do when you are sitting than when you are standing, and less still if you are lying flat. Vigorous muscular effort calls for increased effort from the heart.

Anæmia.—If your heart is to serve you well, it must be well nourished by the circulating blood. You need a well-balanced diet, good digestion, and plenty of fresh air if you are to maintain a good circulation. In acute anæmia, the heart muscle is flabby and ill-nourished because of the poor oxygen-carrying capacity of the blood, there is not sufficient oxygen to burn up the amount of fuel that is needed to keep the muscle supplied with energy for its normal work.

Fatty heart.—The fatty heart muscle—which is less common in youth than in middle age—is a damaged muscle, incapable of carrying out its normal duties efficiently. In both of these conditions breathlessness on slight exertion is an early warning that all is not well.

Reserve power.—The healthy heart muscle is capable of great extra effort in emergency—effort which is not demanded in the ordinary routine of life. It is this reserve power of the heart which would enable you to put up much better time for the quarter-mile if you were being chased by a bull than you are ever likely to do in less exciting circumstances. The reserve power of the heart can be likened to the reserve troops in a battle: they may not be required, but their help may make the difference between life and death if things become really "sticky." It is this reserve power, too, which may be called upon in the crisis of some serious illness, such as pneumonia, in which death may occur through heart failure.

Heart strain.—The heart muscle may be badly strained by immoderate exercise causing severe exhaustion, or by the poisons of certain diseases, such as influenza. The

walls of a strained heart become thin and flabby, and lose a great deal of their pumping power; the pulse of a strained heart is rapid and feeble, and it may fail to pump sufficient blood to the brain to maintain consciousness; at the end of a gruelling boat race some of the crew may faint, even though they are in perfect training. Recovery after a severe strain is usually rapid, provided that the heart is properly rested, but a poisoned heart muscle (due, for instance, to influenza or diphtheria) may need several weeks or months before it regains its normal power, and it is most important that it should not be subjected to strain during the recuperative period.

"Athlete's heart."—If the heart is repeatedly overstrained, it may respond to the calls for supernormal physical effort by thickening its muscular walls and thus becoming larger. Such a hypertrophied heart has increased its immediate power at the expense of its normal reserve power; it is like an army that has thrown its last man into the fighting-line. This means that the heart is no longer able to respond to a call for extra power in an emergency. Such a condition is often found in athletes, and is known as "athlete's heart." Although the heart has enlarged itself and thickened its walls, and so might appear to be stronger than the smaller and normal heart, it is in reality a damaged heart, for it has lost its reserve power. People with hypertrophied hearts should avoid making any violent physical effort, such as sprinting for a train.

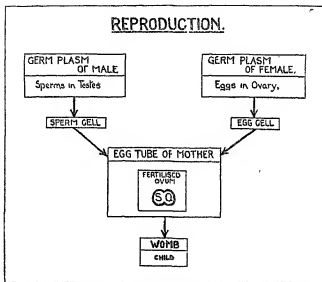
Deductions.—You will realise, then, that although exercise is one of the rules of health, the general rule "Moderation in all things" must be observed. Immoderate exertion, particularly if it is carried to the stage of exhaustion, and even more particularly if it is repeated often, is most unwise.

Reproduction.—This function of the human body I shall deal with fully later on.

Here it is sufficient to say that from the moment a child is conceived certain material is set apart for the carrying on of the species and that this material takes no part in the general body structure. I shall explain how part of this material has been handed on through past generations,

and will continue to be handed on to future generations ; so that, in a sense, we achieve immortality through our children.

The reproductive cells (ova or eggs in the female and sperms in the male) develop in special sex organs, the ovaries



and testes ; and there must be fusion between an ovum and a sperm to give rise to the development of another human being.

HOW THE BODY TEMPERATURE IS CONTROLLED

You probably know that the temperature of the body is remarkably constant at between 98° F. and 99° F., and that departure of a few degrees either way from this constant means death. Have you ever wondered how the temperature of the body is kept so constant in hot and in cold weather and whether we are wearing summer or winter clothes ?

During life, heat is being produced continually by the chemical changes in the muscles and glands, and given out continually from the body to its surroundings.

The amount of heat we produce varies considerably from time to time. During sleep, the great muscles of the limbs and trunk (except those concerned in breathing) are at rest, and the chemical changes which produce heat are limited to those of the vital processes which are constantly taking place in all living matter—the heat-forming activities of the muscles and glands are at their lowest level. During great physical efforts—running, playing vigorous games, etc.—the muscular action produces vast quantities of heat in the body. Yet in health, at all stages of activity from sleep to vigorous muscular exercise, the body temperature remains very much the same. It is obvious, then, that there must be some method of getting rid of the great excess of heat produced by the body; indeed, if this were not so, the high temperature produced after a vigorous set of tennis would cause death from heat stroke.

Excess heat is got rid of through the lungs—in the warm, moist expired air—and through the skin. In man, the skin is the chief regulator of temperature; in animals which sweat very little, like the dog, breathing is the most important means of getting rid of heat: the dog pants when it is overheated, and puts out its tongue so as to lose heat through the evaporation of moisture from its surface. The skin acts in two ways—by the production of sweat which, in evaporating from the surface of the skin, absorbs heat from it, and by dilating the blood-vessels of the skin and so bringing a larger quantity of warm blood near the surface of the body, to give up heat by radiation to the cooler surrounding air.

Refrigerators.—If you studied physics at school, you will remember that when water changes into vapour, it absorbs heat from the surroundings, so that evaporation has a cooling effect. This principle of cooling is used in some refrigerators, and in the homely method of cooling food by placing it in a vessel covered with a wet piece of flannel or muslin, the ends of which dip into an outer bowl of water. the greater the rate of evaporation the

greater the amount of cooling—so that if you place your home-made refrigerator out in the hot sun and in a breeze where evaporation is at a maximum, your food will be the cooler. The more quickly the moisture (sweat) from your skin evaporates, the more rapidly will your skin be cooled.

Becoming chilled.—The cooling process may be *too* rapid, so that you are in danger of harmful chilling; and therefore, when you are sweating freely and your skin blood-vessels are dilated, you should guard against dangerous chilling by controlling the rate of evaporation of the sweat and of radiation of heat from the warm blood in the skin. *After a hard game, therefore, you should slip on a sweater or some other extra garment, and you should avoid sitting in a draught; and as soon as you can, you should remove your damp underclothing and have a bath, or at least a sponge down, and dry your skin thoroughly;* by so doing you may avoid a cold in the head or even such serious consequences as pneumonia or rheumatic fever.

When the body needs to lessen its rate of heat loss (in cold weather, for instance) the skin blood-vessels narrow so that less blood flows through them, and the sweat glands are less active, and so the surface of the body remains dry.

Temperature control by the brain.—How does the body know when the balance between heat production and heat loss is upset and that the temperature is likely to rise or fall dangerously unless the rate of cooling is altered? A department of the central government (the temperature-regulating centre of the brain) is extremely sensitive to the temperature of the blood which is constantly circulating through it, and is in constant touch with the sensory nerves of the skin and with the nerves which cause dilation or constriction of the blood-vessels; this centre controls the temperature-regulating mechanism of the body. If the temperature of the blood tends to rise—during vigorous muscular exercise, for instance—at once the sweat glands are “speeded up” so that evaporation increases and the skin blood-vessels become dilated so that more warm blood is brought to the surface to cool.

If the body is in danger of becoming over-chilled, the processes are reversed so as to reduce the heat loss: the skin blood-vessels are constricted and the sweat glands go on "short time" in response to the "orders" of the temperature-regulating centre in the brain. We do not have to think about these processes—the control of temperature is self-regulating (except in the case of a baby, as the heat-regulating centre is not properly developed at birth); we do not have to make a conscious effort to sweat more freely in very hot weather, for instance: it just happens.

THE CARE OF THE SKIN

The skin cannot carry out its important work effectively so as to protect us from a dangerous rise of temperature or from harmful chilling, *unless it is kept clean and well ventilated.*

Why we wash.—Even when we are at rest, and there is no perceptible moistness of the skin, our sweat glands secrete about a pint of sweat a day through their tiny openings, the pores. The sweat contains certain waste products, as has been stated previously, and these are left upon the skin; the surface of the skin is constantly shedding dead cells, like leaves falling from trees in early autumn: the skin secretes, in addition to the sweat, a greasy material which keeps it waterproof. On the surface of the skin, then, there collects a mixture of sweat, grease, dead cells, together with dirt from without—particles of clothing and dust.

The daily bath.—You will now realise the benefit of a daily bath with warm water and soap, to cleanse the skin and enable it to keep active. A cold bath is invigorating, but it has not the same cleansing effect as a warm bath—you know how much easier it is to wash greasy dishes in warm water than in cold. The ideal for health is to have a daily bath with warm water and soap, and then finish with a cold sponge down or shower. A clean and healthy skin is a sensitive skin, able to keep in close touch with the temperature-regulating centre in the brain by means of its sensory nerve endings and able to carry out its cooling

functions efficiently, and so to protect you from over-heating and from chills.

Skin ventilation.—In order to be healthily efficient, the skin needs something more than cleanliness : *it needs proper ventilation*—it must be bathed continually in gently moving air. In the absence of proper ventilation the skin is surrounded by a layer of moist, over-heated and stagnant air, and cannot carry out its proper cooling functions. Such a skin becomes partially paralysed and insensitive to changes of temperature, and fails to respond properly to the protective temperature-regulating centre in the brain.

This is why clothing has such an important bearing on health. There are many people who are enervated and depressed, who dread the winter because they are continually catching cold—because they are wrongly clothed and so keep their skins half paralysed through lack of ventilation. *A healthy, clean, well-ventilated skin is our greatest protection against chills and many other diseases.*

THE OBJECT OF CLOTHING

Apart from the custom of not exposing the naked body to view, the objects of clothing are to prevent too rapid chilling of the skin and, in sunny weather, to protect it from an overdose of sunlight. If, however, the clothing interferes with the ventilation of the body, the health suffers. There is no doubt that the majority of people are over-clothed. As I have previously pointed out, clothing cannot make heat ; it merely regulates the rate of heat loss by radiation from the warm skin surface to the cooler surrounding air. The healthy skin responds to a sudden lowering of temperature by constricting the skin blood-vessels and by checking the action of the sweat glands, and so protects the body from excessive cooling by diminishing the rate of heat loss. The pale, clammy, half-paralysed, over-clothed skin is too sluggish to function effectively and cannot adjust itself to the sudden changes of temperature that are inevitable in our climate ; its unfortunate possessor catches a chill from the least draught because his body temperature, instead of remaining normal,

is dangerously lowered, and so his resistance to infection is decreased.

Healthy clothing.—The best rule for clothing is “as little as possible.” Garments should be loose-fitting, of light weight, and—except for outer garments to protect us from cold east winds—of a loosely woven material which does not interfere with ventilation. Air itself is a bad conductor of heat, and so the air spaces of the open meshes of a cellular material prevent the body heat from escaping too quickly, while at the same time they permit proper ventilation. For the same reason, loosely knitted garments are warmer than tightly knitted ones of the same thickness of wool. Two thin garments are warmer than one which is thicker than the two thin ones combined, because of the layer of air between the two. Because leather allows a certain amount of ventilation, while rubber is *air*-proof as well as waterproof, leather shoes are more healthy than rubber ones, especially for those whose feet sweat freely.

In addition to its health-giving properties, clothing which permits proper ventilation of the skin has the advantage of being very much more comfortable to wear. If you want a proof of this, go for a long brisk walk, even in cold weather, wearing a mackintosh and Wellingtons!

THE EFFECTS OF SUNLIGHT ON HEALTH

We are fast becoming a nation of sun-worshippers, and this is all to the good provided that sunlight, like all the other good things in life, is used and not abused.

The sun sends forth several different kinds of rays. There are *light* rays, which are stimulating generally and give the best illumination for human vision. There are the *heat* rays (called “infra-red” rays, because in wavelength they come next to the red or lower end of the light spectrum) which we can feel but cannot see; in moderation they are good—they are used in the treatment of various diseases—but too much heat is enervating and depressing, and great heat may cause death from “heat stroke.”

Ultra-violet rays.—The rays about which we hear most nowadays are the *ultra-violet* rays (which come immediately above the upper or violet end of the light

spectrum), and the tanning of the skin which follows repeated exposure to sunlight is due to them.

The effect of exposure to the ultra-violet rays of sunlight is a definite stimulation of all the chemical changes (metabolism) of the body. The body fires burn more clearly and there is a sense of well-being and *joie de vivre*. These rays act as a food, too, by producing vitamin D—the sunshine vitamin, as it is sometimes called—from the fat of the skin which is exposed to them; and as we can store this vitamin in our bodies, the summer's sun-bathing gives us a reserve of vitamin D to help us over the winter. Ultra-violet rays are good disinfectants: for instance, the germs of tuberculosis, which can live for years in darkness, are killed in a few seconds by exposure to sunlight. You may not know that exposure of the naked body to sunlight is now used to cure those cases of tuberculosis which formerly, before the full value of sunlight treatment was known, were treated by operation as a last hope of arresting the disease. Rickets, too, the deficiency disease caused by lack of vitamin D, can be cured rapidly by exposure to sunlight, as well as by giving cod-liver oil or some other food rich in vitamin D.

Sun-bathing.—To make proper use of sunlight, we must recognise the need to get into training for sun-bathing, to accustom ourselves gradually to increasing exposures (see "Sun-bathing," p. 101). We must remember that the ultra-violet rays are exceedingly powerful rays that can, in excess, cause severe burns of the skin and such general symptoms as irritability, headache, loss of appetite, insomnia; they may even cause death from "sunstroke." We must distinguish between the heat and the light of the sun, and choose occasions for natural sun-bathing when the benefits of moderate exposure to ultra-violet rays may be enjoyed without suffering the harmful effects of excess of heat.

THE CONTROL SYSTEM OF THE BODY

The nervous system (brain and spinal cord and nerves) and the glands of internal secretion (the so-called "ductless glands") are in control of all the functions of the body.

A vast network of nerves and nerve cells throughout the body gathers information and carries instructions; and the secretions of certain glands are the chemical messengers which travel not by nerves but by the bloodstream. The brain is the central government, and the spinal cord represents subordinate governing bodies, like county and town councils and local committees, which look after the routine work of the body without bothering the central government. Many activities—such as breathing, digesting, the beating of the heart, the secreting of the glands—are subconsciously controlled by the more primitive part of the brain, the “little brain” as it is called, and this part of the brain is always on duty, even while you sleep. The complex muscular movements involved in walking are carried out quite automatically after you have learnt to walk; and this is so with many other co-ordinated movements, including those involved in games and sport—hence “practice makes perfect.”

The Nervous System

The brain.—The brain is a collection of nerve cells and their branches or fibres. Each cell may have many branches which divide and subdivide like the branches of a tree; but one branch, which is much longer than the others and does not give off lateral branches, is the important nerve fibre which carries messages, like the telephone wire.

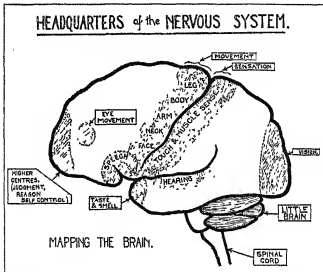
The nerves.—Bundles of these long main branches form the nerves. none of the main branches reach directly from the brain cells to the surface of the body, and so the messages have to be relayed from other nerve cell groups on the way.

The spinal cord.—The brain may thus be compared to the central telephone exchange, the nerves to the telephone wires along which flash messages to and fro, communicating between the brain, the groups of nerve cells in the spinal cord (the branch telephone exchanges), and the sense organs of the body, the skin, eyes, ears, nose, etc

The brain or “central exchange” has separate departments each dealing with some particular branch of

living, such as seeing, hearing, smelling, balancing, breathing, keeping the heart beating, controlling the secreting of the glands, remembering and reasoning, and so on ; and we know roughly where most of these departments are situated in the brain.

Reflex actions.—Some messages from the sense organs can be dealt with satisfactorily by the operators in the branch exchanges, without troubling the central exchange staff : for instance, if while you are reading a book your lighted



cigarette end accidentally touches your hand, a message is flashed from the sensory nerves of the burnt skin to the branch exchange in the spinal cord, and instantaneously, without consulting the central exchange, the operators at the branch exchange send out messages to put into action the appropriate group of muscles to pull your hand away from the burning cigarette end.

Such responses, in which some stimulus leads to action without your having to think about it, are known as

"reflex actions"; and a great many of the activities of the body are carried out in this way.

Sense organs.—Those parts of the nervous system which gather and transmit information are the sense organs. Your eyes are like cameras which take moving pictures and send them to your brain; your ears notice and report the vibrations of the air (sound waves), your nose detects and reports smells, your tongue identifies and reports tastes, and your skin distinguishes and reports separately sensations of heat, cold, touch and pain. Without your sense organs to give your mind information of your surroundings, you would almost certainly be an idiot, unable to learn to speak, unable to feed yourself, unable to protect yourself from fire and other common dangers.

We have compared the nervous system with the vast intercommunicating system of telephones. Is there also any human function comparable to *wireless* telegraphy? Almost certainly there is, although we are still in ignorance of the exact way in which it operates. There are sufficient well-authenticated cases of the communication of minds across space—as, for example, the case of a woman in Scotland conveying mental impressions to her friend in France, who translated these impressions in the form of sketches—to convince us that the human brain can communicate by "wireless" or, as we call it, telepathy.

The glands of internal secretion

Chemical messengers.—The other system of communication is a chemical one, with "chemical messengers" instead of nerve "telephone wires" and the receiving and transmitting stations. Fifty years ago, no one suspected that certain groups of cells, forming the glands which send their secretions directly into the circulating blood, had any particular influence on our bodies and minds. Now we have conclusive evidence that these glands may determine whether we are idiots or normally intelligent or brilliantly clever, peace-lovers or quarrelsome; calm and placid or nervous and "highly strung"; and whether we shall be dwarfs or giants or just of average size. Some of these glands, like the pancreas and the sex glands, produce other

secretions, too, which flow away along their special ducts in the usual way; so that the popular term "ductless glands" for these tissues is not correct. The secretions which are gathered up directly into the blood—the "chemical messengers"—are called *hormones*; the word "hormone" means "that which sets in action." These hormones can be compared to little keys which are discharged into the blood, there to flow along until they find the lock which they fit; each key has its own special lock which no other key will fit, and it must unlock the right door before its message can be delivered. These glands work together in harmony, co-operating like the musicians in an orchestra; the piano cannot take the part of the violin, but each is necessary for the proper rendering of the music. When you feel "out of harmony" with the world in general, it may be that your gland orchestra is at fault!

Our knowledge of the functions of the glands of internal secretions is still incomplete, but we cannot but be amazed at what has already been discovered.

Your accelerator.—The thyroid gland in front of your air-pipe in the neck can be compared to the accelerator of a car, because its hormone regulates the rate at which the body engine works. If too much secretion is produced, the body's accelerator is pressed too hard and the engine "races," using up its fuel and repair material wastefully; the body becomes thin and wasted, and we are irritable, restless, excitable, anxious, and generally emotional. If, on the other hand, too little of the thyroid hormone is produced, the engine will only just "tick over," without providing enough power for the body and mind to work normally—the body fires will be sluggish and we become fat and listless and dull-witted. A child whose thyroid is not producing enough secretion fails to grow and develop normally; it will be stunted physically and backward mentally. Such defective children, who are known as cretins, can be cured by taking, continuously throughout life, an extract of the thyroid gland of an animal. Tadpoles whose thyroid glands have been removed will not develop into frogs; young tadpoles which are fed with

thyroid extract change into frogs while they are still tiny, and the frogs are the size of flies.

Giants and dwarfs.—The *pituitary* gland, about the size of a pea, is situated above the roof of the mouth, just underneath the brain. Although it is so tiny, it produces at least two powerful hormones, one of which controls the growth of the skeleton; dwarfs have too little, and giants have too much, of this hormone; the other causes contractions of certain muscle tissue, including that of the blood-vessels of the womb. It therefore influences the blood pressure and the action of the womb in childbirth, and injections of this hormone are used in certain cases to raise the blood pressure, or to help the womb to contract firmly during and after the birth of a baby.

Your super-charger.—The hormone which is called upon in emergencies, to help us to protect ourselves by being alert and strong, to fight or to run away from danger, is produced by two glands called the *adrenals*, which are situated close to the kidneys. An extra supply of this hormone is released into the blood during excitement or fear or anger or any other strong emotion which calls for action. It makes the heart beat more powerfully and releases extra fuel (sugar) into the circulation to provide for a greater output of energy. It makes you think and act more quickly and increases your muscular strength.

Sugar control and diabetes.—The *pancreas* is a gland which has both an external secretion (the digestive juice which flows through its duct into the small bowel), and an internal secretion or hormone which is released directly into the circulating blood. The pancreatic hormone controls the use of sugar by the body, and absence or deficiency of this hormone leads to excess of sugar in the blood and is one cause of the disease diabetes. The new treatment of diabetes is to give "insulin," a pancreatic extract containing this hormone.

Sex hormone.—The male sex glands (testes) are also examples of glands with both internal and external secretions; their external secretions contain the male germ cells (spermatozoa) which are capable of fertilising the female germ cell (ovum or egg) and are therefore essential

for reproduction ; while the internal secretion or hormone from the sex gland is concerned with the development of characteristics that make for manliness, and has a powerful influence on the whole personality.

The operations for rejuvenation, sometimes performed on old people who desire to regain some of their lost youth and vigour, aims at increasing the production of this sex hormone.

Efforts to stave off old age or to regain youth have been made since the earliest times. In mediæval days there was keen search for an Elixor Vitæ. In the twentieth century promising results have been obtained by Voronoff—who grafts the sex glands of monkeys into man, and by Steinach—who checks the production of sperms by cutting the ducts from the testes and at the same time increases the production of the sex hormone. Both methods are still very much in the experimental stage, and we are not yet justified in hoping that they will be of much practical value to man. At present our hope of a long and vigorous life must lie in clean and healthy living.

Perils of excessive strains.—The cells of the nervous system and of the glands of internal secretion are the workers in control of the body's engineering and laboratory plant, and they have a strong influence on the mind and personality. If we wish to maintain our bodies at a high pitch of efficiency and not to cut short our span of life, we must not overwork this delicate control system of the body, by making unreasonable demands upon it, as we may do by denying ourselves proper rest and sleep ; and we must not poison it with drugs or with toxins from infected teeth, tonsils, sinuses, or bowel. To make a habit of late nights, to flog ourselves to unreasonable effort and vivacity with drugs such as alcohol and tea and coffee, to poison ourselves with the waste products which an exhausted secretory system fails to eliminate, can only lead to premature old age. *The natural remedy for fatigue is rest and sleep.*

THE EFFECT OF MIND ON BODY

The study of physiology and modern psychology have revealed the far-reaching and powerful influence of the

mind on the physical processes of the body. Let me give you just a few illustrations of this relationship. Hypnotists have succeeded in raising a blister on a subject's skin by applying a piece of ordinary stamp paper and suggesting to the hypnotised patient that it was a blistering plaster. I have myself heard patients say that they have had complete relief from pain after they have had an injection of *plain water*, and not, as they believed, of morphia which, for certain medical reasons, could not be given to them.

The emotions.—The emotions have a great influence on the body, and anger, fear, and worry work havoc in human lives. Few people know that a fit of anger may give a dose of poison as surely as though it had been swallowed; and thus is one of several reasons why you should learn to control your temper. A fit of anger in a mother who is breast-feeding her baby may, through its poisoning effect on the milk, produce convulsions in the child. The emotion of fear, for example, produces a substance (hormone) which causes the pupils of the eyes to dilate, the hairs to "stand on end" (actually the tiny muscles attached to each hair root constrict and tend to pull the hairs erect), the heart to beat more quickly and the blood pressure to rise, the liver to release an extra supply of fuel (sugar) into the circulating blood, the digestive movements of the stomach and bowel to cease and the digestive juices to stop flowing from their glands, so that the mouth becomes dry from lack of saliva. Other distressing emotions besides fear—worry, anger, grief, and anxiety—will diminish or inhibit entirely the flow of the digestive juices and the churning movements of the stomach, so that the food you eat when you are in the grip of such emotions may simply stagnate in the stomach, there to ferment and cause indigestion. It would be more true to say that "Man is what he *digests*," rather than "Man is what he eats"; and perfect digestion demands a placid, cheerful frame of mind, and the pleasure in eating that comes from a healthy appetite.

It is well known that anxiety emaciates people, whereas happiness and contentment are powerful aids to nutrition and physical well-being.

If you aim at perfect physical fitness, then, you should

cultivate self-discipline, so that your emotions shall be your servants and not your masters. Undisciplined people sometimes try to hide their lack of self-control under the label "temperament," and make this an excuse for pitiable displays of irritability and general lack of "ballast." The wise man or woman cultivates healthy habits *and serenity of mind*. Self-control makes you to a great extent "master of your fate": to an extent at least most of the "whips and slings of outrageous fortune" injure you just so much as you like to let them, *and no more*.

REPAIR OF INJURY AND DEFENCE AGAINST DISEASE

In order to maintain health, the body has to defend itself against its natural enemies, those germs which can cause disease, and against injury due to poisoning with drugs (alcohol, tobacco, tea and coffee, etc.) or to neglect of any of the laws of health, and it has to make good any accidental damage.

Repairs.—Although we cannot provide ourselves with living "spare parts," our repairing powers in health are truly marvellous. Broken bones will join up again; ulcers will heal by growing new tissue from below and a new patch of skin over the surface, with new blood-vessels to replace those which have been destroyed; our blood will set into a sort of jelly to block the open ends of cut or torn vessels, preventing fatal hæmorrhage from such a slight injury as a cut finger; and a poisoned organ such as an "influenza heart" will recover and function normally again when the source of the poison has been removed.

Life is strife.—There is continual warfare between our bodies and harmful germs. Not all germs are harmful to us, fortunately, or the dice would be too heavily loaded against the human race. The germs of disease are everywhere in their teeming millions, in the air we breathe and in the food we eat (unless it has been sterilised immediately before we eat it); you and I, at this moment, quite possibly have the germs of influenza and diphtheria and pneumonia and meningitis and of many other diseases in the lining membranes of our mouths and throats and air-passages.

Our skins and lower bowels give hospitality to various kinds of germs which can cause disease. Why, then, do we not all develop these diseases?

Immunity.—Because our bodies have their own natural defences; and the power these defences give us to resist disease is known as our *immunity*. Continued small doses of the germs of disease develop in us a natural immunity—if this were not so, the human race would soon die out. We have to live “on terms” with the lower forms of life. If for any reason we lose our immunity, or if we suffer a “mass invasion” of germs instead of “the little daily dose,” the germs will probably triumph and we shall contract the particular disease to which they give rise. Our natural immunity—our resistance to disease—is at its highest level during perfect health; such conditions as bad nutrition, fatigue, cold and wet, mental depression, bad ventilation and alcoholism diminish immunity. We are therefore much more likely to “catch” an infection if we are tired and cold and depressed than if we are feeling “full o’ beans.” Although the commonest of ailments—the cold in the head—is a definite infection, sitting in a draught or neglect to change wet shoes may be the *predisposing* cause. Other things being equal, the man who is “too fond of the bottle” has less chance to survive an acute illness, such as pneumonia, than a man who is either a very moderate drinker or teetotal.

Our army of defence.—When germs of disease do succeed in penetrating our “first line of defence,” they may attack us by themselves getting into the bloodstream and being carried along, to settle and multiply and produce their poisons in various parts of the body (as in typhoid fever); or their poisons alone may get into the circulation (as happens in diphtheria). The white cells of the blood (the phagocytes) do battle by trying to absorb the germs—they alter their shape so as to flow around and ingest them, just as the amœba ingests its food; they are rushed up in the circulating blood to the site of the invasion in increasing numbers, until the germs are killed and victory is assured. The increased blood supply causes the affected tissues to become warmer and swollen and reddened, and painful owing to the increased pressure, and these are signs of

inflammation. Inflammation is the body's healthy reaction to infection, and the yellow matter (pus) which may be formed is composed largely of the dead phagocytes which have been slain in battle.

Chemical warfare.—When the poisons (toxins) alone are absorbed into the bloodstream, the body responds by producing protective substances (anti-toxins, etc.) which are able to destroy the poison just as an acid neutralises an alkali. Some anti-toxins can be extracted from the blood of animals and used to fight disease in humans by injection into their blood.

"Anti-toxins."—The use in this way of the anti-toxin of diphtheria in the early stage of the disease, before the body has had time to produce sufficient quantities of its own anti-toxin, has doubtless saved thousands of lives. Each toxin has its own particular anti-toxin—in other words, the anti-toxins are "specific"; we cannot use the diphtheria anti-toxin to neutralise the toxin of any other disease. The blood fluid (the serum), by developing other protective substances, may destroy invading germs by causing fatal chemical changes in them, or in various other ways.

Most of the harmful germs swallowed with our food are killed by the acid of the digestive juice in the stomach—otherwise food poisoning would be much more common than it is.

A healthy, well-nourished body is the greatest protection against disease.

The end.—In the end, the Reaper appears. The wonderful body machine runs down and finally stops. To youth, death seems so remote; he feels he is not concerned with the problems of middle and old age. Yet I believe that those who *in youth* live without serious thought of health may quite easily mortgage the future and cut short their span of life. Natural death from old age is comparatively rare: the common cause of death is disease, and most disease is preventable by reasonable observance, *during youth and after*, of the laws of health.

"A long life and a merry one" is surely not an unreasonable toast. The last stages of "a short life" are almost invariably far from merry, and the ghost of premature death ever stalks in the background.

CHAPTER IV

HOW THE MIND WORKS

KNOW THYSELF !

I can never think of the remark "What a wonderful time youth would be if only it came later in life" without marvelling at the wealth of meaning expressed in those few words. What might we not make of life, if only it were possible to possess all the knowledge that experience of life brings while we still retained the perfect health and boundless energy of youth ! How often the tragedy of a life may be summed up in the simple words "Too late !"

Well, it is no use crying over spilt milk. Most of us must expect to learn some of our lessons when it is too late to profit by them ; to some extent at least we must buy experience, and pay the price with as good a grace as possible. By the exercise of forethought we should be able to avoid laying up for ourselves a great load of vain regrets ; for the rest, we must face with a bold heart the troubles we fail to avoid. There are few difficulties which do not either disappear or else shrink to insignificance when they are boldly faced.

You will save yourself a good deal of trouble if you *know yourself*. It may help you to know yourself if you understand something of the mental processes. Most likely you have read some psychology, and quite probably also some of the stuff that passes for psychology. The difficulty of sifting the grain from the chaff may already have come to your notice.

Psychology.—During the present century, quite remarkable progress has been made in the study of the workings of the mind ; but, of course, finality has not been approached. The authorities themselves are not in complete agreement on all points, and a great mass of wild stuff

has been written by people who have no claim to be considered authorities. I call to mind that, in a recent case, a witness proposed to give evidence "as a psychologist." The judge asked him to state precisely what he meant by that, and, after listening to his explanation, said, "I think I see. A psychologist is a man who *says* that he is a psychologist." Up to a point, the judge was correct; there is nothing to prevent any one from calling himself a psychologist. Nevertheless, there are people of established reputations who have devoted years to the study of the working of the mind; and although there are differences of opinion among them on some points, there is substantial agreement as to the fundamentals. In the reading of books on psychology, one difficulty is bound to present itself—there is no rigid uniformity in the terminology, and so a word may be given somewhat different meanings by different psychologists. It is, however, possible to give a very simple statement without using many words in a technical sense.

Without attempting to define exactly what we mean by psychology—there is no universally accepted definition—we may say that it is concerned with the workings and activities of the mind; and we need not stay to consider just what we mean by "mind." We all have a rough working idea of what we mean by the "mind," and of what we mean by the workings and activities of the mind; and for our purpose rough working ideas will do perfectly well.

Every one is, to an extent, a practical psychologist. Every one wonders at times just why some one else does, speaks, and thinks as he does; whether he speaks as he thinks, whether he even thinks as he thinks he thinks, and so on. Every one at times tries to discover why he himself feels as he feels, why he finds it difficult to make up his mind, why he changes his mind, why something comes "into his mind," why he discovers within himself this or that bias. Every one, as he accumulates experience of life, attains to a certain degree of skill in judging other people's motives, and learns to guess something about the workings of his own mind in a practical sort of way. In short, every one becomes something of a psychologist in the same way

as every one becomes something of a physician. Just as some knowledge of the body may assist you to keep your physical health and save you from having to learn by "*trial and error*" what it is wise to do and what it is wise to avoid, so some little knowledge of the workings of the mind may save you time and trouble, and make it easier for you to live in harmony with yourself and your fellows.

If you have the good luck to be one of those happy individuals for whom the sun is always shining, and who fit into the scheme of things by a sort of natural aptitude, then it may not be worth while to worry about the why, and wherefore—except that it is all intensely interesting. If you are one of the more usual types, and have your good patches and your bad breaks, then a little knowledge may be of tremendous help. "A little knowledge" need not be a "dangerous thing" if you recognise clearly its limitations. Fortunately, most of what you need to know for practical use will put no strain upon your credulity; you will recognise its truth as soon as it is stated. Don't expect to become a profound psychologist; there can be few sciences which require longer training and greater natural gifts than psychology. It might almost be wise to abolish the word itself from your vocabulary, together with nearly all the other technical terms, and to think of the mental processes just as you think of the physical processes in ordinary everyday language. There need be nothing "deep"—you will recognise instances of most of the processes almost as soon as they are described.

There is no psychology (in the common meaning of the word) of the simple cell; it has instincts, which it gratifies when the circumstances are favourable, and fails to gratify when the circumstances are unfavourable. It has no problems to solve by the exercise of intelligence and will; it is the creature of its heredity and its environment. Life cannot be expected to be so simple for such a complex, intelligent, and emotional being as man.

A human being has a whole outfit of instincts and impulses and emotions. It is difficult to imagine circumstances in which a human could be merely the creature of his instincts; for even among his most primitive

instincts, on some occasions one would be impelling him in one direction while another would be impelling him in the opposite direction. There would be conflict between impulses, and he must exercise some choice.

The herd instinct.—Among the very strong human instincts is the instinct of gregariousness. Man feels the need to be a member of a "herd" of some sort; and his continued membership of his herd necessitates some loss of freedom to gratify the impulses of some of his instincts; the herd will not tolerate a total disregard of its interests by one individual member. In return for giving up some of his freedom, the individual gains certain advantages; and amongst these advantages, there are some which depend upon the giving up of some of their freedom of action by the other members of the herd, where such freedom would be inimical to his interests.

There is more than one interpretation of the phrase "one of the herd." In the course of an argument different meanings and shades of meaning may be intended by the parties, and the meaning is apt to become changed during the course of a long argument. It is well, then, to be perfectly clear that the "herd" implies the human society in which an individual lives, and not merely that part of it which is sometimes described as "the vulgar herd," or "the man with the muck-rake."

Without suggesting the existence of any sort of contract or agreement between the members of the herd, you will probably hold that each member of the herd is morally bound to *give* as well as to *take*; he cannot make out any moral claim to take advantages which are given to him upon the understanding that he considers the interests of the herd, unless he *is* prepared to consider those interests. If he pretends to consider them, but in fact disregards them whenever he can do so without discovery, he is simply a cheat.

It is not infrequently argued by the man who wishes to evade his responsibilities to the herd, that he had no wish to become a member of the herd, and has no wish to remain one. In some cases, perhaps, the other members of the herd who are aware of his existence feel very much

the same as he does about his membership; but they cannot deal with it except in exceptional circumstances. In sober truth, membership of the herd is as much a fact as the law of gravity, and must be accepted with all that it implies.

In man there is implanted a need for something more than mere *toleration* by the herd; he needs to enjoy some measure of approval, esteem, and respect. The approval of a small "set" may be sufficient; but it is doubtful if there are many in whom no need of esteem exists.

Standards.—To be tolerated by the herd and to be held in some esteem by the herd or by some fraction of it, may suffice for a rather low type of human; but in the higher types there is, in addition, a need for *self-respect*, a conscience, a moral standard, an ethical code—call it what you will; there are some things which a man *must* do, and some things which he must *not* do, if he is to live on good terms with himself; and it will readily be seen that this conscience—or whatever we call it—may well be a much more exacting master than the opinion of the herd. The herd may be deceived and it may forget or forgive; but it is much more difficult to deceive oneself, and to forget, and to forgive.

The existence within one individual of so many urges and so many needs makes it inevitable that his mind shall be a battlefield, whereon these diverse pushes and pulls compete and conflict with one another. Sometimes a conflict may resemble an individual combat, sometimes a gang fight, and sometimes a battle royal, wherein a number of men enter the ring and the last man left on his feet is the victor.

Free will?—Conflict, then, there is and must be. The great majority of these conflicts are easily decided; but some of them are unpleasantly difficult. Here, perhaps, it is necessary to touch upon the evergreen question—free will or no free will. Have you a free "will"—something above and beyond these impulses and yearnings and needs—which acts as judge and referee? I am *not* going to try to settle the point. I am prepared to admit that it is extremely difficult to answer the argument that each of us is the mere

product and victim of his heredity and environment. Granting all this, however, I do suggest that, except when you are arguing or thinking about the actual point, you carry on as though you had a free will, and as though every one else had a free will. You would not freely forgive the man who gave you a punch on the nose and pleaded that his hereditary and environmental influences had left him no choice; you would probably discover in a flash that *your* heredity and environment had left you no choice, either!

Certain it is that many of the conflicts require long and concentrated thought, and leave you mentally tired by the time a decision is reached; while if the emotions are deeply involved, you may experience that exhaustion which is so different from healthy tiredness. If you were "leaving them to fight it out" as I think you are doing when you decide to "sleep on it" perhaps, there should hardly be this exhaustion. It does seem as though you are exercising something—but whether it is your "will" or not, I give no opinion.

Complexes and constellations.—We can hardly avoid the use of the word "complex," which is one of those words which is used to bear several meanings. We shall use the word "constellation," where necessary, to mean all those ideas and feelings which have become associated in our minds with some instinct or urge or idea, so long as they are all in the conscious mind. If instead of being wholly in the conscious mind the system of ideas and feelings is partly in the conscious mind and partly in the unconscious mind, then we shall call it a "complex" and not a constellation; while if the whole system is in the unconscious mind, we will call it a "buried complex." ("Complex" is sometimes reserved for the buried complex, and sometimes used to include constellation, complex, and buried complex.)

The terms "conscious mind" and "unconscious mind" may need some definition. An idea is in the conscious mind when its existence in the mind is known and recognised and appreciated—when you are fully aware of it. If an idea is somewhere in the mind, but its existence

there is forgotten and overlooked and unappreciated, then that idea is in your unconscious mind. (You will hear "sub-conscious" used for this particular meaning of "unconscious," by the way.)

We can say now that conflicts are not between impulses simply, but between the constellations or complexes of which the impulses are the centres; and if you imagine yourself to have represented all your impulses by centres and their constellations or complexes by circles, with each circle cutting many of the other circles, you will have some idea of the complexity of some of the conflicts.

Conflict is not in itself a bad thing, or an exceptional thing—it is the everyday rule of life; we might almost say that every decision we take is preceded by a conflict. It is plain, then, that most conflicts are solved without any distress or other evil effects; and this will usually be the case where constellations only are involved. If everything to which the conflict relates is in the conscious mind, we shall be able to endure it and settle it, even though it may be a bit of a puzzler or a bit of a nuisance.

"Repression."—If, however, the conflict (or some part of it) is so unpleasant that it is more or less intolerable to the conscious mind, there is a risk that it may be dealt with by "repression"; that is to say, it may be pushed out of the *conscious* mind. It is doubtful whether you ever forget any experience whatever so completely that no trace of it remains anywhere in the mind; and it seems to be certain that you do not forget anything which has been pushed out of the conscious mind because of its unpleasantness—it continues to exist in the unconscious mind. This process itself of pushing out cannot be accomplished with complete success by a deliberate effort of will—you cannot say "I *will* forget." Yet there must be a strong element of wish or desire, for it is but natural to prefer to avoid the unpleasant; there is thus a purpose to be served, even though you may not be really aware of it. Just how it happens it may be difficult to discover; but it does so happen that the unpleasant thing is banished from the conscious mind, and settles itself in the unconscious mind. There may,

or may not, be moments when the position is seen clearly, when you are aware of everything and deliberately "put it out of your mind." In any case, the *immediate* effect of "repression" is that you are saved from having to face up to something which is unpleasant or intolerable.

There seems to be proof that "repression," *in this narrow sense of the word*, is a bad solution to a conflict, and that really serious results may ensue.

Here, I think, it is wise to pause awhile over this word "repression." In psychology "repression" has a definite and narrow meaning—it is the pushing out, from the conscious mind into the unconscious mind, of something which is unpleasant or intolerable to the conscious mind. It serves a purpose, since it saves us (for the moment) from having to face something that is unpleasant. It is not the result of a conscious effort of the will (except sometimes to a very slight extent); in a way, it just happens within us. It is this repression that is bad, and gives rise to all manner of troubles.

In ordinary conversation the word "repression" has a very much wider meaning, and it had its meanings long before the "repression" of the psychologist was known to take place at all. What may be perfectly true of the "repression" in its narrow, technical sense may be, and often is, utterly untrue of "repression" in its wider meanings.

It is a great pity that words, which are already in everyday use, are seized upon and used as technical terms with definite and narrow meanings; it would save a great deal of trouble in the world if entirely new words were invented for use as technical terms. We find "complex," "conscious," "unconscious" and other words used to bear meanings which require exact definition; and it is only by studying the definitions that we discover in what sense a particular psychologist is using them. When the words are loosely used by those who are not acquainted with their definitions, queer results follow. Perhaps the word "repression" is one of the best examples of the misconceptions that arise owing to this unfortunate misuse of terms.

We find—as a deduction from the fact that “repression” (in its technical sense) has harmful effects—that “repression” (in every sense) is bad; and this must lead to absurdities when the word is used to cover almost every sort of control and discipline, whether from without or from within. It is a matter of fact, and not a matter of opinion, that the man who does not repress (*i.e.* control, restrain) many of his impulses—at least to the extent of not expressing them in action—comes up against the “herd” and suffers sharply; while if he does not repress (*i.e.* control) them *easily*, he suffers through the strain of having to repress them for fear of the consequences. In short, the man who does not repress (*i.e.* control, restrain) many of his impulses is a curse to himself and to every one else. “Repression,” in *some* of its meanings, is one of the foundations of civilisation. You may not shoot the lad whose sports car you covet; you may neither flay the neighbour whose loud-speaker is driving you frantic, nor settle the matter by inviting him to “Pistols for two. Coffee for one!” However strong, however “natural” these impulses may be, you must repress them. Yet the “naturalness” of an impulse and the harmfulness of “repression” are not infrequently seized upon as excuses for undesirable behaviour.

Understand, then, that when we speak of “repression” here, we mean that unsound method of solving a conflict which has painful associations. We do not use repression in the wider everyday meanings. We all tend to “repress,” by the way, even after we have recognised its dangers, and even when we try to avoid it.

Forgetting.—A constellation may, if it has no unpleasant emotional associations, sink into the unconscious mind and be forgotten, in so far as it is possible to forget anything. It does no harm there; it sleeps quietly, but the complex which has been pushed into the unconscious because of some painful or unpleasant associations does not sleep quietly; it is always “working,” so to speak. You may “cut” your undesirable acquaintance, but he does not oblige by dying on the spot; he is rather a pestilent sort of fellow, who is ever seeking an opportunity to force him-

self upon you, or to do you any sort of injury that he can manage.

I hope that you have gathered that the presence in your unconscious mind of buried complexes which may do harm is not necessarily evidence of deliberate shirking on your part. Something or other, in an attempt to save you from the unpleasant, has pushed them there for you; the attempt may achieve its immediate object, but there is real risk that, in so doing, it lets you in for very much more serious troubles. You are, in a way, the victim of the efforts of a well-meaning, misguided, and unknown friend. There is often an element of weakness on your part, in that you have almost unwittingly called for help, and "aided and abetted."

You may be able to pull up the buried sources of trouble, the undesirable acquaintances, into the conscious mind again, and look them squarely in the face; and then they, like most other troubles and enemies which are faced boldly, will either disappear or lose their power to injure you. Psycho-analysis aims at achieving this object.

Although you may not consciously "repress," there is little doubt that you can avoid a great deal of repression by a determination always to face facts quite clearly whenever you can, however disagreeable they may be. You are bound to have impulses of which you are not a bit proud—*every one has them*; and the higher your standards, the more you may be shocked to discover them. As you will see later on in this book, some of the most estimable people have quite unpleasant impulses; you can no more help having them than you can help having thick ankles. There is not the slightest reason why you should give way to them, or suffer through not giving way to them; you can "work them off" in perfectly safe and satisfactory ways. Don't, therefore, let yourself in for trouble that you can avoid, by failing to face up to things, *particularly when you discover within yourself a disinclination to do so.*

Before we turn to the commoner processes of the mind, I think that it will be of interest to give an illustration of the possible dangers of "repression"—not because you are very likely to bring such extreme evils upon yourself,

but merely as evidence of the wisdom of making a real effort to face facts clearly and honestly, whether they are pleasant or unpleasant, of making a habit of "knowing yourself" to the best of your ability.

Neuroses.—Crichton-Miller takes three soldiers in the Great War as examples of three common types. A. hates many of the incidents of war, the break-up of his family life, the risks of maiming and death—in short, he would much rather *not* go out to the war; he recognises this quite clearly, but sets against it his feelings of patriotism and duty. His own self-respect requires that he shall join up, and he sees the thing through like a good soldier. C. is a different type of man; his yearnings for safety are far stronger than any calls of duty, patriotism, and self-respect; he is called up, malingers deliberately and successfully, and gets his discharge. Notice that neither A. nor C. represses—both recognise quite clearly that they hate the war. B. is an intermediate type. He, too, loathes many of the incidents of war, but he is unable to tolerate the idea that he is anything less than a hero; he manages to convince himself and others that he is eager for the fray, joins up, and does his best. Something happens—perhaps he is knocked over by a shell and sustains slight concussion; but he does not recover sufficiently to return to the line; all manner of symptoms appear which are not explained by the injuries he suffered, and which do not yield to treatment; he has developed a "neurosis." He is not, like C., a deliberate malingerer—indeed, he would be horrified at the very suggestion that his symptoms were the result not of his injuries, but of his own buried conflict—of his failure to face up to facts as did A. and C. The "neurosis" serves two purposes—it keeps him from the line and it preserves for him his self-respect; it at once protects and deceives. Neuroses, of course, occur in civil life; the instinct of self-preservation is not the only strong instinct which we may be called upon to thwart; but it is not the actual thwarting of the instinct which causes the neurosis—it is the buried conflict, the failure to face the facts.

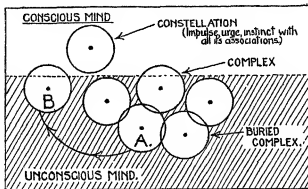
We may now turn to some of the other possible evils of repression, and to other matters of the mind.

Nervous strain.—A complex—a system of ideas and impulses—which becomes buried because of its painful emotional associations, tends to force itself upwards into the conscious mind ; it does not “ stay put ” unless the pressure is maintained. It is like the undesirable acquaintance whom you “ cut,” but who tries continually to force himself upon you. The effort of keeping him “ in his place ” imposes some nervous strain upon you. You will quite possibly be able to find instances of this within yourself.

“ Touchiness.”—The buried complex, even though it is kept “ in its place,” may be only just below the surface. It might be compared to a submerged island with its apex only just covered by water, likely to be “ fouled ” by any passing vessel. The buried complex is apt to be “ fouled ” by little incidents and experiences, and then there are emotional strains. You will certainly know some people in your circle of acquaintances who are absurdly “ touchy ” on some points ; you may possibly already know *why* they are so touchy, although they may be quite in ignorance themselves. If you find that *you* are unduly “ touchy ” on some points, that your reactions are abnormal and out of proportion, then suspect some buried complex ; and, if you can, drag it up and have a good look at it—and then laugh at yourself for having let it upset your balance.

Transference.—Queerly enough, the emotion associated with one complex (A) may transfer itself to another complex (B), and, as a result, anything which brings B to your mind will rouse the emotions which properly belong to A. You are probably quite aware that anything which happens to “ remind ” of somebody of whom you are very fond gives you a pleasurable sensation ; here, generally, you know what is happening, although sometimes you will have to cogitate deeply to trace the connection. You can quite see that the same sort of “ reminding ” may take place in the unconscious mind ; and then you may be in complete ignorance of the connection. Firth (“ Machinery of the Mind ”) gives a case of a woman who had had a passion for a married doctor and had been unable consciously to tolerate the idea ; in her case, pleasurable sensations were aroused by doctors’ brass plates !

Compensation.—With “compensation” we all have a practical acquaintance, whether we call it by that name or not; and in many cases there is nothing to be said against it. Our feelings of envy for the good luck of X. may be completely dissipated by our contemplation of our own good luck as compared with less fortunate Y.’s, and we are in smooth water again. Compensation may operate with one leg, so to speak, in the conscious mind, and the other in the unconscious mind; a strong emotion in the conscious mind may have its opposite buried in the unconscious



A constellation is entirely within the conscious mind; a complex is partly in the conscious mind and partly in the unconscious mind, a buried complex is entirely in the unconscious mind.

Emotion associated with complex A may be transferred to complex B (See text)

mind—love and hate may be thus closely associated. Compensation may also operate wholly in the unconscious mind; *over-compensation* would often describe it better. The man who is ashamed of his humble origin may become an utter snob; the person who for some reason feels inferior compensates by assuming an aggressive attitude; or he may dream dreams (by night and by day) of himself as a wondrous superman, dealing with difficulties with ease and ruling destinies with the wave of his hand. You will all of you be able to find instances of compensation within your own circle. You may avoid the

risk of providing an example by insisting upon being honest with yourself. You can hardly expect to have the beauty of Apollo, the strength of Hercules, and the brain of Aristotle—but the probability is that you have your fair share of natural advantages, and with them it is well to be content; your “line” is to decide to make the most of the material with which you have to work, and not to cry for the moon.

Projection.—There is yet one more regrettably common mental process of which you will at once be able to identify many, many examples. It is called “projection,” and for once the word almost tells you what it means. “Shifting the blame on to some one or something else” comes very near to it in meaning; “blame” is not the exact word, nor is the process one of which we are conscious; if you can imagine the “shifting” to be done entirely by the unconscious mind, you get a very fair idea of what is meant by “projection.” The quarrelsome man is quite sure that other people pick quarrels with him, and the mean man that no one is *really* capable of generosity—that the apparently generous man expects to reap great benefit; the woman who is (unconsciously) obsessed by sex suspects every man of wishing to seduce her. Probably every one “projects” a good deal; there is the underlying desire for perfection always ready to “shift the blame”; the bad workman grumbles at his tools. We shall all of us have observed the working of this process in others. We listen to excuses which would not deceive a child put forward seriously as *reasons* by apparently intelligent people. Many people seem to take it as an axiom that they and theirs are faultless; they seem to be completely unable to see the facts when they (or theirs) are concerned, and to say “What is the matter with *me*? Where did *I* go wrong?”

Sublimation.—A process which is not vastly dissimilar to transference provides us with the most satisfactory solution to many difficulties. It may be impossible to give expression in action to some strong impulse or instinct, either because of our own standards or because of the interests of others. The energy which demands an outlet may be directed into other channels where it serves useful ends of

which we can approve. A common example of this is the satisfying of the maternal instinct by a woman who has no children of her own, in such occupations as nursing or various forms of social work. Pugnacity may express itself in anti-social ways, so that a man is ever ready to quarrel and fight; but it may find an outlet in fighting for a cause—we have all of us been astonished at times by the pugnacity of some of the advocates of peace! Although this “sublimation”—this re-direction of a strong impulse and its energy—operates unconsciously in many cases, it can nevertheless be utilised consciously to solve problems, provided that we have faced the facts clearly and honestly in our minds.

CHAPTER V

DRUGS AND GAMBLING

THE leading article in my daily paper one morning was headed "A Nation of Drug Takers," and I quote some extracts from it. "Yet the truth is that we are all drug takers, not merely by accident, but with our eyes and mouths wide open. The three drugs which are in universal use are tobacco, tea, and alcohol." "It goes without saying that over-indulgence in tea, coffee, tobacco, or alcohol brings its punishment, just as over-indulgence . . ." "On the whole, the evidence shows that, within moderation, the big three are the friends of mankind. They ease the strain of modern existence. They encourage companionship, and play the rôle of 'soothing stimulants.' Thus in our wise horror of dangerous drugs, we can yet be thankful for those which are our friends, so long as we refrain from allowing that friendship to degenerate into undue intimacy."

ON "ALCOHOL"

The foundations of your attitude to drinking are likely to be laid during your later teens; so that unless you give thought to the matter fairly early in life, your attitude is apt to be settled for you by your environment, and not, as it should be, by your own deliberate decision.

You do not need me to tell you that drink ruins many careers, and smashes many a right good fellow. Some of you will decide for strict teetotalism, and by so doing make sure of avoiding all danger; but only a minority of adults are strict teetotalers, and so I suppose that the majority of you too will drink to some extent.

I propose to put before you fairly fully the effects of alcohol, and you must then weigh up the pros and cons, and make up your mind for yourself; but *do* come to a decision. Don't just drift into habits which you may later

regret and then find extremely difficult to break. If you find yourself in doubt, there can be no harm in being a teetotaler for the time being ; you can always change your mind later on, when you have had more time for observation and thought ; and you will not be handicapped by a formed habit. While you are considering, it is worth while to bear in mind that drinking is an expensive habit, and that you may well get better value by spending your money on other things. It is well, too, to disregard exceptional cases in this, as in other things ; there are men who drink heavily and appear to suffer no harm, but they are very rare and very exceptional.

Bodily effects.—Let us take first the bodily effects of alcohol. It needs no digestion and is quickly absorbed by the body to form heat and other forms of energy. Most heavy manual workers have no doubt that a pint or two enables them to increase their output ; nevertheless, direct tests seem to prove that alcohol lessens the amount of work done. The point must be left in doubt. Tests prove conclusively that the quality of work suffers, if it is work that needs anything more than muscular effort.

Habit formation.—Alcohol has a drug effect ; and with it, as with other drugs such as cocaine, there is the danger of habit formation. The body develops a certain tolerance, so that the regular drinker needs increasing doses in order to achieve the desired "kick."

"Short drinks."—"Short drinks," which contain a high percentage of alcohol, irritate the lining of the throat and stomach. Frequent irritation of the tissues, no matter by what means, is dangerous, and is almost certainly one of the predisposing causes of cancer. Regular indulgence in short drinks—including, of course, cocktails—will certainly cause indigestion, and may possibly cause gastric ulcers and cancer.

Regular excess.—Excessive quantities of alcohol taken over a period, in the form of short drinks or of long drinks, leads to degenerative changes in various organs ; and these changes may be so gradual that their effects pass unnoticed until some acute trouble manifests itself. It may by then be impossible to cure the damage, or even to arrest its

progress. Going on the water wagon at once may not avail; once started on their course, the changes *may* persist and progress, in spite of treatment. I knew one man, who had never been drunk in his life, to die after three years of misery as a direct result of continued rather heavy drinking, although he had not touched alcohol for the last sixteen years of his life. He told me that he had no idea that drink had had any effect whatever upon him until he went up for medical examination for life insurance; he was told that no insurance company would look at him; he became a teetotaler at once, but, although this undoubtedly prolonged his life, it did not save him.

Occasional excess.—It is necessary to draw a clear distinction between two different forms of excessive drinking, though some people are addicted to both. We will illustrate by two hypothetical and extreme cases. A. has a really wild night on quarter-days, takes altogether too much, and becomes absolutely drunk; in between times he keeps away from the bottle altogether. B. never gets drunk, and never even takes more than he can “carry” with dignity; but he drinks *regularly* more than the perfectly harmless amount.

Since his higher faculties of reason, judgment, and self-control are out of action, A. may land himself into all manner of trouble during one of his bouts, and his reputation probably suffers. The direct physical effects of his excesses, however, are probably temporary only; the “morning after,” he will have “a head, a mouth, and a tummy”; *but he will now give his body time to recover from its ill-treatment.* He may suffer no permanent injury at all; and if he gives up his quarterly celebrations, his body will permit him to forget all about them.

B. takes none of A.’s risks, and quite possibly pities or despises A. for his weakness; but B. is (almost certainly) going to pay a very heavy penalty for *his* form of excess. Gradually increasing digestive troubles and a general loss of tone are the *least* that he must anticipate; years of miserable ill-health will probably be his fate. Death will probably come unnecessarily early; alcohol is sometimes a direct cause of death; but it also lowers the resistance to

disease, and seriously lessens the prospects of recovery from serious operations and from certain illnesses.

In the face of all this, you may wonder why every doctor does not come down heavily in favour of strict teetotalism. You will notice, however, that I have been talking about the effects of *excess* in some form or other. Those who take alcohol in strict moderation do not suffer these effects. Like fire and water, alcohol may be a good servant but it is a terrible master. I must confess that there are times when I wish that I could abolish alcohol from the world.

Mental effects.—Now as to the mental effects, in so far as they can be considered separately from the bodily effects. Alcohol gives a glow of well-being; it soothes the worried man and braces the tired man, it loosens the tongue of the dull dog, and gives some measure of confidence to the shy and timid; it increases one's sociability. *It achieves all these effects by acting upon and depressing those centres of the brain which control the judgment, the reason, and the critical faculty.* On occasion, this may be all to the good, provided that it is strictly limited in its extent; but if the dose and the effect are much increased, it is common knowledge that the normally quiet, sensible man may become an irresponsible and boisterous fool.

Teetotalism.—It is impossible to make out much of a case against teetotalism; particularly during youth, life itself ought to be a joyous experience and need no artificial aids. There can be no harm in remaining a teetotaler for a few more years, until you have had time to look about you a bit more, and gained sufficient self-assurance to drink just as much as you wish to drink and no more, whatever the occasion and the company may be.

Moderation.—Strict moderation commands more favour than teetotalism, and it seems certain that the moderate taking of alcohol is compatible with perfect health, for some at least it is compatible with perfect athletic condition. For "rot-gut," such as neat spirits, liqueurs, and cocktails, and for excess in any form, there can be nothing but condemnation from every one who really respects his body and mind.

It will be useful to state briefly what strict moderation

implies ; and before giving actual figures, it is well to point out that the amounts which are moderate for the vigorous, out-of-door worker are excessive for the sedentary worker ; and to emphasise again the dangers of departing *regularly or often* from the strictest moderation. The amounts per day given by some authorities for indoor workers doing light manual work are : Two pints of beer or three of light ale, or one pint of light natural wine, or one gill of spirits. Alcohol is best taken with meals, and spirits should be well diluted.

Some "tips."—It will not be amiss to give one or two little bits of information which are better learnt by the experience of others than by personal experience.

If you drink when you are tired, the effects are greater and more immediate than those produced by an equal dose when you are fresh.

An amount which has little effect when it is taken with a meal, may easily "knock you over" when you take it on an empty stomach.

You may become drunk quite suddenly ; if you take several drinks in quick succession, you may have no warning that you are approaching the limit of what you can "carry." This fact explains many cases of seduction.

Alcohol stimulates the sex urge ; and as it at the same time weakens the powers of judgment, reason, and self-control, it is responsible for many cases of venereal disease and for many illegitimate births.

You may feel quite unaffected by the drink you have taken while you remain in the same atmosphere, and yet be overcome when you go out into the open air.

There is no way of "mixing" drinks so that one "kills" the other, in spite of the widely held fallacy to the effect that you can do so.

"Treating."—I regard the almost universal habit of treating as a most pernicious one. A group of half a dozen decide that the time is ripe to "have one." A. calls for a round, B. calls for a round ; C. cannot appear to be mean, and so he calls for a round, and so on. The result is that each has six drinks, *and each pays for six drinks* ; so that each might just as well have paid for his own

drinks as he had them ; but there is this difference—if each had paid for his own drinks, each would have had the one or the couple that he really wanted, instead of half a dozen.

I believe that the custom leads to a great deal of excessive drinking, and it is particularly difficult for a youngster to stand out against it. It does seem to me that if you were to say plainly "I'm having a couple only, so I'll pay for my own and stand out of the rounds," you could not be accused of meanness. You should not suffer in any other way either, and you may even score ; for every one has a sneaking admiration for the man who has the courage to do what he would like to do himself but dare not. Anyway, if you mix with a crowd who drink at all heavily, you have to find some solution, or else follow suit.

Summing-up.—We may summarise the salient points . Alcohol is unnecessary and expensive. In strict moderation it is compatible with health and long life, and may add something to the pleasure in life. Regular drinking, except in the strictest moderation, leads to the degeneration of the body, mind and character, and is nothing but a curse. If alcohol is taken, it is best taken with meals, and not in a concentrated form. If, from any reason whatever, you find it impossible to drink in moderation, then cut it out of your life altogether. Nothing is lost, and much may be gained, by remaining a teetotaler while you are young.

TOBACCO

It has been suggested that many people hated bear-baiting, not because of the pain it caused to the bear, but because it gave pleasure to the spectators. The kill-joy of to-day still views with suspicion any form of pleasure ; but the average man refuses to regard life as a grim pilgrimage from the cradle to the grave, and *he* looks with suspicion upon any one who questions the wisdom or worthwhileness of his pleasure. A doctor does not expect to be exactly popular when he tells a man that he must cut down his smoking ; yet sometimes this is the only treatment needed, and the only treatment which will relieve the patient.

Few things are either completely and invariably good or wholly bad ; the lean must usually be taken with the

fat. Smoking may be a blessing—a harmless source of comfort and pleasure ; it may also be a danger to health. Tobacco may be used wisely or unwisely ; the effects of excess may be serious, but they are neither so obvious nor so devastating as the effects of alcoholic excess. The damage done is much less frequently irrevocable—in most cases, giving up tobacco, or even cutting down the amount consumed, will mend matters.

Tobacco is a narcotic poison. Many of us discover some of its effects when we first sample it ! I quote, with reference to smokers, “The toxicity of their blood is suggested by the fact, related by Cramer, that a leech applied to a smoker soon fell off and died in convulsions.” It is indeed a happy thought for the smoker that the gnats and mosquitoes that torment him may be committing suicide !

Most people’s bodies develop a tolerance for tobacco, and there is substantial agreement among medical men that smoking, although of course it is quite unnecessary, is compatible with health and with long life. We read of centenarians who attribute their longevity to their never having smoked, but we also read of centenarians who love the weed. Most people find it best, however, either to give up smoking or else to cut it right down when they want to get into training.

Effects.—There is not complete agreement among the medical authorities as to all the possible effects of smoking ; but there seems to be no question that it may be responsible for headache, nausea, giddiness, tremor, loss of appetite, impairment of taste and smell, depression, insomnia, lack of energy, mental sluggishness, troubles with the eyes, throat and heart, gastric trouble, and bronchitis. I quote without comment, “The depressing effect of smoking on the sexual appetite and on potency in the male and fertility in the female has been observed both in experiments on animals and in clinical medicine (von Bunge, Funbringer, Hofstaetter).” After all this, it is a relief that no one has suggested smoking as a cause of housemaid’s knee !

It is often claimed that smoking gives some measure of protection against infection, but this is held to be extremely doubtful at the very best ; and, in any case, it is more than

counter-balanced by the irritating effects of the smoke upon the parts with which it comes into contact.

Moderation.—In view of all these possible troubles, the "Safety First!" man will decide not to smoke; and maybe he is wise in his decision. These evils are, however, the results of excessive indulgence; and the man who observes the golden rule of health, "Moderation in all things," should escape them. There is some difficulty in deciding for any individual just what is excess and what is strict moderation. The amount that you can smoke without any harmful effect is moderation for you; anything over this is excess—for you. If this sounds rather like having to eat the toadstool in order to find out whether it is a mushroom or not, you may draw comfort from the fact that the effects of making a mistake with tobacco are less permanent! If you recognise any harmful effect you should cut down your amount; and you must regard as an effect of smoking any symptom which disappears when you stop smoking, and reappears when you resume smoking. The degree of tolerance of individuals varies enormously. There are the extremes—the exceptional man who can never cultivate any degree of tolerance at all, and the exceptional man who can smoke heavily with (at least apparent) impunity; the majority of people fall between these extremes. I see that one authority gives five cigarettes a day as the safe maximum; this would be equivalent in weight to about two ounces a week—but pipe tobacco is usually about twice as strong as cigarette tobacco. Your degree of tolerance varies a good deal with your state of health and habits; you will be more affected when you are leading a sedentary life than you will be when you are leading a vigorous out-of-door life.

Inhaling.—No authority has a single word to say in favour of inhaling. Although pipe tobacco is stronger than cigarette tobacco, pipe smoke is alleged to contain much less carbon monoxide than cigarette smoke; carbon monoxide is a very harmful gas, and, when it is inhaled, it lessens the oxygen-carrying capacity of the blood. Pipe smokers are not often given to inhaling, while cigarette smokers are. The paper of cigarettes is not now held to be harmful.

To sum up.—Let us summarise the pros and cons :

Tobacco costs money. You may easily spend enough in a year to pay for a good holiday. If you don't start smoking, you will never miss it.

Smoking is a soothing, pleasurable, and sociable habit.

Medical opinion is that smoking in strict moderation is compatible with health and longevity ; that smoking to excess may lead to all sorts of trouble ; that inhaling is utterly bad ; that it is best not to smoke during your early years (twenty-one is suggested as the minimum age), or on an empty stomach, or early in the day.

Practical experience shows that smoking may spoil "the wind," and that it has to be almost or completely dropped during training for athletic events.

Harmful effects may not show themselves until fairly late in life. One authority says that it is in the fifties that a man "begins to *cough* his curses of tobacco." Needless to say, trouble that has been brewing for a quarter of a century may prove to be very obstinate.

There is grave danger of habit formation and consequent excess. No one ever *intended* to smoke to excess when he first took up smoking ; but the craving feeds upon itself.

Most of the evil effects of smoking can be cured by giving up smoking entirely or by cutting it down ; *but either is apt to be the very deuce !* You can easily drift into excess, but you will not *drift* back into moderation !

TEA AND COFFEE

You may be surprised to find tea and coffee included with alcohol and tobacco as drugs ; and so I will say immediately that I agree fully with the medical man who wrote of tea, "When properly prepared from leaves of good quality and taken in moderation, it forms a harmless, exhilarating beverage, acting as a stimulant to the cerebral and cardiac centres and lessening the sensation of mental fatigue." You will notice that this approval is somewhat guarded ; the tea must fulfil certain conditions, and there must be moderation.

I read some time ago of a hale and hearty nonagenarian

who was still running a greengrocery business. The reporter who wrote him up, asked him the usual question—to what did he attribute his remarkable vitality. The old man replied that he had given up alcohol sixty years ago, and had taken to tea; and he added, "*The teapot stands on the hob all day long.*" I must confess that I almost jumped when I read that. Sixty years of stewed tea! There it is, however; to almost every general rule, including the rules of health, there can be found occasional startling exceptions.

Tea and coffee must be considered in exactly the same way as alcohol and tobacco, for it is quite certain that many people suffer harm from them.

Tea and coffee both contain caffeine, which is an alkaloid stimulant, and is responsible for the refreshing properties. They contain other constituents which give flavour and aroma, "body," and colour; and they also contain an astringent acid.

The proportions of these various constituents are not constant, they differ in teas grown in the different countries, in the leaves of the same plant, and even in the different parts of the same leaf, and the fermentation to which the black teas have been subjected also alters the proportions.

The tea-blender aims at creating a mixture which will give the best possible flavour and aroma, and the highest possible proportion of caffeine to astringent. So far as the actual tea is concerned, China tea comes nearest to the ideal, but it lacks "body" and colour, both of which are attractive to many people; young leaves are better than the older leaves, and the tips of the leaves are better than the remainder. Poor quality teas contain much of the old leaves, and of the ribs.

Fortunately we can exercise a fair measure of control over the composition of the infusion itself. It is found that tea infused for forty minutes contains only about 5 per cent. more caffeine than tea infused for five minutes; while the astringent acid content is 150 per cent. greater. Other tests indicate that even two minutes suffice to bring into solution nearly the whole of the caffeine, and to produce the full flavour and aroma.

The astringent acid, which increases so greatly when tea is allowed to "stew," interferes with the gastric juice and causes indigestion; it may go further, and cause chronic gastric catarrh and constipation.

To sum up.—Now we have before us sufficient of the facts of the case to sum up. The drug effect, which may be harmless and beneficial in moderation, may well become harmful if there is any excess; and very strict moderation indeed must be the watchword of those who have a nervous temperament or cardiac trouble. There is the danger of drifting into excess with caffeine, as with other drugs.

The astringent can certainly do no good; if we are normally healthy, and our tea is properly made and taken in moderation, we are entitled to hope that we shall withstand its effects. Its presence is to be deplored; but, as in so many other cases, we have to take the lean with the fat; and so we take the risk of digestive troubles in order to enjoy the stimulation and comfort which the caffeine provides; it is obviously wise to minimise the possible evil effects as much as we can; and so we come to consider what constitutes "a good cup" of tea.

Use a tea of good quality—China if it satisfies you—black rather than green, tips rather than whole leaves; take one teaspoonful for each two cups of the infusion; let the water have just come to the boil; *let the tea "draw" for two or three minutes only* (perhaps a little longer for China tea). There are some strainers which enable you to remove the leaves when the time limit is reached; some people prefer to use two teapots, both of them warmed of course; the tea is made in one pot, left for the proper period, and then poured through a strainer into the second pot. You will see that the custom of pouring extra hot water on to the tea leaves for a second round is not within these rules; it is a bad habit. Make sufficient tea in the first place; if you need more, go through the whole process again.

Most of what has been said about tea might also be said about coffee. White coffee is to be preferred to black, since milk lessens the action of the astringent.

GAMBLING

The love of some sort of a flutter fascinates so many people and so intensely that we are probably correct in regarding it as an almost universal human instinct. I do not state this by way of approval, justification, or excuse. The instinct to kill, or at least to injure, any one who annoys us seriously is probably just as universal; nevertheless it meets with little encouragement in civilised communities.

I am not going to discuss the moral aspects of gambling. If you feel that gambling is wrong morally I assume that you will not gamble. If you don't feel that way, I should hardly hope to be able to convince you; and, in any case, I should not consider this to be the place for an attempt. I propose to discuss it in the same way as I have discussed alcohol, tobacco, tea, and coffee; it is one of the "problems" of life, and particularly of youth; it may lead to serious harm. It shares with drugs the drawback of being habit-forming.

Betting.—Whether or not racing would come to an end if betting ceased is an open question; but it certainly seems to be the case that the betting is the only part of the whole business that appeals to great numbers of people; it is only necessary to visit a race meeting to learn that quite a number of the visitors make no attempt to see the actual racing.

Horse-racing used to be justified by some of its supporters by the contention that racing, together with hunting, improved the breed of horses and secured a steady supply of suitable mounts for cavalry officers. This is no doubt one of the incidental results of racing; but I do not expect to hear any one put forward the same argument in favour of dog-racing.

Other supporters of racing used to urge that it provided employment for large numbers of people and a market for a good deal of home-grown agricultural produce; to which their opponents replied that both men and produce might be better employed.

I think that it is better in this, as in other cases, to face the matter honestly, and to avoid all "cant." The justification for racing, if a justification is required, is that it gives

pleasure to a great many people, and that no one is compelled to pay any attention to it if he does not wish to do so.

Up to a point much the same might be said about betting. It does give pleasure to a great number of people, and no one is compelled to bet. Betting does, however, do a great deal of harm ; it is at least doubtful whether racing, as distinct from betting, does. Many wise people never bet. Among those people who do bet, the level-headed do not let betting become an obsession, and are willing to pay what it costs them as the price for the thrills they derive from it. The weak and foolish come to grief, *and frequently involve others in their misfortunes*. It is a matter of common knowledge that betting does gain a hold over some people which can be compared to the hold of drugs.

There can be no question of the statement that, on the average, the backer loses heavily ; for it is on his losses that the bookmaker waxes fat. The backer who relies upon the tips of the sporting journalist, the man who knows a man whose cousin is a jockey, and the optimist who "picks 'em out with a pin"—all are welcome to the bookmaker, who, I am informed, lumps them together comprehensively as "the mugs."

It seems reasonable to suppose that the sporting journalists who are employed by reputable papers should be as sound judges and guides as any one. They are at least as intelligent as most people, they make racing a life study, and their jobs must depend to some extent upon their success. Looking in the summary given in the noon edition of "The . . ." one day, I found that, for the 3 o'clock race at Folkestone, ten out of the thirty-four prophets selected Sicca, nine Hotcha, five Decorum, and so on. I think that we are entitled to deduce from this that the most earnest and intelligent study of form leads different experts to different decisions ; or, to put this in another way, that with all the available facts before them, the "doctors differ." I feel that you are entitled to know the result of the race : Sicca won, Hotcha did not run, Decorum came third, being beaten for second place by Apperley, which was the selection of one only of the thirty-four prophets.

In the 2 o'clock race at the same meeting, seventeen out of thirty-two selected Warship to win, and no other found favour with more than three. In the evening I saw that Warship finished third, behind Kenneth the Scot (tipped by one), and Diometer (tipped by none). I think that we are entitled to deduce from this that, even when the available evidence is so utterly conclusive that more than half the prophets find themselves in agreement, that evidence is not a reliable pointer to the result.

It is true, of course, that owners and trainers are in a position to know when they have something really good; but is it to be supposed that they broadcast these good things? They back them themselves, and they want to get the longest possible odds; if they talk and thereby cause many people to plunge on their good thing, the price shortens at once.

I am assured that there are people who actually make a living out of backing horses; but I gather that it is a whole-time job, and requires a very substantial "bank." I am prepared to believe that, apart from these, there is a man here and there who makes his betting show a profit; but the general view among men of wide experience is that the man who expects to win over a period is unduly optimistic—and that most of those who *say* they do, fail to keep strict accounts.

The test, "What sort of people does betting attract?" does not yield a completely one-sided answer. Many excellent people bet. Yet, on the other hand, racing does gather about it pretty well as unholy a crowd as can be found within the four seas.

In so far as younger people are concerned, the answer to the test is much more conclusive than it is when it is applied to older people. I think that it would be generally agreed that there is almost invariably *something* unsatisfactory about the youth who takes a keen interest in betting. Just why it should be so, it is difficult to say. Perhaps it is that the normal, healthy youth finds the world full of much more interesting and worth-while things, and so has no time left for betting; perhaps it is that with his natural energy and enthusiasms he needs none of the

somewhat artificial and unhealthy excitement of betting. The normal youth probably goes to a race meeting if there is one in his immediate neighbourhood just as he goes to any other "show" if he has nothing that he wants to do more; and being at the meeting he probably lays out a few shillings to increase his interest in the racing, fully expecting to lose it and willing to do so in return for the excitement; but for the rest he finds more satisfying employment for his time and money.

Cards.—Card-playing for money has one grave drawback, even as compared with other forms of gambling—it is much more difficult to be sure that you will be able to set a limit to your losses. In many games, unless you are playing for really negligibly small stakes, your opponents may strike a run of "nigger luck," and hit you very heavily indeed. There is always the temptation to carry on, feeling that the luck *must* change; and in any case, it is not easy to drop out when the rest wish to carry on, just because you are losing; it looks suspiciously like being unable to take a beating in a good spirit, backing out, and all that sort of thing. I think that gambling at cards is a game that young people are wise to avoid. Apart from the possibility of losing more than you can afford, there is the danger of habit-formation.

If you do play for money, it is wise to play only with people in your own circle and whom you know well. Playing with strangers is sheer folly, though I fear that youngsters will continue to *buy* that knowledge.

Sweepstakes.—I suppose that no one buys "sweep" tickets as a business proposition, since it must be obvious that if there is any deduction from the total subscribed, for expenses or anything else, our chance is worth less than what we pay for it. We buy tickets mainly because we hope to win a prize; and being human we pretend, even to ourselves, that we do it to help along a good cause. Of all forms of gambling, I suppose that sweepstakes are open to the least objection. You know at once the extent of your (probable) loss, and there is little likelihood of sweepstakes becoming an obsession.

CHAPTER VI

EXERCISE FOR HEALTH AND PLEASURE . AND SUN-BATHING

THE NEED FOR EXERCISE

A living thing is a changing thing, it is ever undergoing the twin processes of metabolism—breaking down and building up again. Although the changes take place even when we are asleep, the body is so constituted that it needs to have the rate of change greatly speeded up at intervals if it is to be perfectly fit, and this speeding up is the chief function of exercise.

A good game—or its equivalent—does much more than benefit the muscles of the limbs and trunk. The breathing becomes deeper and more rapid, the heart beats more quickly and more strongly, the skin pours out sweat; the whole body becomes more vividly awake—and the whole of the internal organs and the brain are toned up. The total effect is that of a general overhaul and repair combined with a vigorous spring cleaning. Neglect of exercise means general stagnation, increased susceptibility to infection, probably constipation, and an all-round lowering of quality and efficiency.

The ill-effects of insufficient exercise may not be felt immediately; and even when they are felt, they are often attributed to some other cause. A period of slackness leaves its mark on the body, and it is often difficult to bring it back to perfect condition afterwards. The failures to “come back” are due much less to age than to the deteriorating effects of a period of inactivity. The wonderful “old men” of sport are those who keep themselves fit all the time—they do not have to try to come back, for they have never faded out of the picture.

Occasionally, as in all other cases, you come across exceptions; more frequently you find apparent exceptions;

but you may take it as the general rule that those who take "no exercise except splitting infinitives" go to pieces early—and, even before they go to pieces, get only half as much enjoyment out of life as they might. Individuals vary greatly in this as in other things. Some are hard put to it to keep fit, even though they take a good deal of exercise; they are usually committing errors of diet—eating too much and eating the wrong kinds of food. The great majority require no more exercise than they can manage without any undue sacrifice of time.

So far we are talking of exercise as a grim necessity; and as a necessity it *must* be regarded. However busy you may be, whatever the calls upon your time, it is sound business to take off so much time as is necessary for proper exercise. Exercise is not a luxury, and the time given to it is not wasted. In the long run, you will do more and better brain work if you keep your body tuned up.

The ideal.—The ideal is, undoubtedly, plenty of exercise in the open air every day, so that you go to bed just healthily tired and wake fresh as a lark in the morning. Some few jobs provide these conditions, but the majority do not; and though some of us have plenty of time for exercise, many of us are tied to sedentary, indoor work for the greater part of most of our days; and we have to consider how to manage "the necessary minimum."

Time is sometimes the great difficulty; but facilities for outdoor exercise are often lacking, particularly in towns. Some hardy souls strip off and have their run in the very heart of London, and for them I have the very deepest respect; but it is no use suggesting this as the solution for most people.

If you wish to be in perfect health, you must do your utmost to put in *some* exercise daily. A good game or its equivalent at the week-end is all to the good, and some rely upon this alone; but year in and year out, "it's the little daily dose that does it."

In the winter particularly it is the little daily dose that is the chief difficulty. Apart from the weather, the days are so short that it is dark by the time that we are free in the evenings. Exercise has its best effects when it is taken

out of doors and in the sunlight ; but failing the best, we must be content with something less than the best.

Walking.—There is a lot to be said for walking. It must be admitted that many people find walking dull ; and that brisk walking along crowded pavements is difficult and irritating ; but if you cannot arrange for any substitute, then walk and put up with its drawbacks—or else make up your mind to suffer the penalties of slackness. If you will not tolerate the remedy, you must bear the disease. Except when the weather is wet, most of us could, without a great deal of trouble or the sacrifice of much time, manage at least two brisk walks a day ; and often it is possible to arrange so that part of the walk is across a park or common. In the winter, walking may be your only opportunity for getting daily exercise in the daylight and in the open air. The brisk walk in the morning is one of the best possible tonics ; if you do not believe it, try it in the next cold spell, and you will be astonished to find how little you feel the cold although other people are grumbling about it. Well, there it is ; exercise you must have, and it is best taken during the daylight and in the open air ; but if you can't or won't walk, you must look round for some substitute ; but it is better to take some other exercise in addition to walking and not instead of it.

Skiping.—Skiping is a wonderful exercise, whether you do it simply for health or for training purposes ; and if you can do it in the garden and in light clothes, and follow it with a bath and a brisk rub down, it will at least prevent you from running to seed. “Running on the spot”—in other words, skiping without a rope—can be practised where there is no room to swing the rope.

“Physical jerks.”—There are many systems of physical culture in use, some requiring apparatus and some not. The old-fashioned systems generally aimed at developing huge muscles ; they did achieve their end ; but they are now almost universally condemned. A man may have tremendous muscles, and yet be absolutely unfit ; it is far better to aim at condition, at fitness, and to let the muscles be whatever size they happen to be. Most modern systems aim at fitness ; some of them are frankly curative—they

set out to cure the effects of slackness ; and provided that the effects have not gone too far, they do it. If you avoid the systems which still aim at excessive muscular development, then there is everything to be said for "physical jerks" ; but bear in mind that exercise in the open air is best. Some walking, some skipping, and some system of physical exercises will keep you very near to concert pitch.

Early exercise.—I doubt very much the wisdom of strenuous exercise in the early hours. Walking, or ten minutes' *light* "jerks," I regard as the most that the majority can undertake with safety and benefit ; the tough ones may substitute a short jog-trot ; but, in most cases, anything more than this should be postponed until later in the day, when the body has become more tuned up to its work. Some people undoubtedly derive benefit from an early morning swim, but others find it quite unsuitable ; it is one of the things you must find out for yourself, if you feel inclined for it. If you find that you are toned up by the early dip, then almost certainly it suits you and you do really benefit, but if you are at all chilled, and particularly if you feel lethargic during the day, you will be wise to give it up.

To sum up.—Try your utmost to get some exercise *every day*. If you can manage, let it—or at least some of it—be during the daylight and out of doors. A brisk walk is the best start for the day's work.

EXERCISE FOR HEALTH AND PLEASURE

I trust that I have not emphasised unduly the bread-and-butter aspect of exercise. Most of us look upon exercise in some form or other as one of our greatest sources of pleasure ; this is quite as it should be, but it must be kept in mind still that exercise is a necessity ; you *must* take regular exercise if you wish to keep your health, whether you enjoy it or not. Food served up in an attractive form and eaten in good company and pleasant surroundings will be better digested and more beneficial in every way than the same food "thrown at you" and eaten in other circumstances ; and so, too, exercise which you thoroughly enjoy will prove in every way a greater tonic

than exercise which is taken merely as a duty. Whenever possible, let your little daily dose take the form of some game or sport ; and have a real good "go" at the week-end.

Young people usually need no encouragement to throw themselves whole-heartedly into games, and it is an excellent thing that it should be so. There is, however, need for a word of caution against letting games—play—take up an unreasonable proportion of your time and energy. "Moderation in all things" is ever the golden rule.

Games.—"Sir. *A reasonable proficiency in a game of skill is a sign of a well-balanced mind ; but such uncanny precision as you display is conclusive evidence of a misspent youth.*"

I cannot recall the name of the man who was responsible for these words of wisdom, nor can I guarantee the correctness of the quotation ; but I think that here we have food for thought.

Most young animals play, but few adults ; and in the play of animals we can usually detect a certain practical value as well as pleasure, their play is in great part training for their later life—finding and killing their food, hiding or escaping from their enemies, fighting for a mate. In man, the instinct to play in some way or other persists throughout life, unless it is killed by ill-health or by the souring influence of continued hardships. The play of children resembles that of young animals—they are discovering and improving their powers, developing their strength, and learning about their environment. The play of adults seems to have pleasure for its main object ; other benefits are not wanting, but they are more or less incidental.

The youth who intends to be master of his fate and to get the most out of life will consider his attitude to games in the same way as he considers his attitude to other things ; and his objects will be to derive from them the maximum of pleasure and other benefits without incurring any penalties or suffering any ill-effects.

The tendency with some is to let games become an obsession. When does an interest in games cease to be reasonable and become immoderate ? Certainly when it

leads to exhaustion or staleness, or takes up so much of the available time and energy that the day's work—whatever it may be—suffers. Certainly, too, when excessive keenness leads to displays of "temperament" (loss of temper and lack of self-control), to "gallery play" (showing-off—an infantile trait), or to any other manifestations of bad sportsmanship. So far I assume that most people will be in complete agreement; but I think that we must go beyond this, and say that the interest has gone too far when it swamps other interests, and, in so doing, limits mental development; the enthusiast is apt to become mentally stagnant.

Games should be *one* interest in life. "Chasing a pill round a meadow," or any other game, is a fine relaxation and amusement; but surely any one who makes it his chief interest in life has just failed to grow up.

The urge to measure oneself against one's fellows in feats of skill, strength and endurance is deeply implanted in most healthy youngsters; this spirit of competitiveness needs an outlet, and the best outlet is to be found in friendly contests.

Choice of games.—The choice of games must depend upon physical strength, agility, age, sex, individual taste, and a number of other factors; there is no *best* game. The game that you enjoy most is probably best for you. For all-round development of character it seems wise to take up one team game, and, in addition, some game or sport in which you have to match yourself as an individual against single opponents. A team game calls for subordination of self—self-discipline and the unselfish consideration of the interests of the team as a whole; while the more individual contest demands independence and self-reliance. The one helps you to become a good member of the herd, the other trains you to stand upon your own feet. You need to develop yourself along both lines.

Training.—A reasonable amount of regular daily exercise will keep you healthy; but if you intend to go in for any form of violent exercise you need to get into training for it. With the actual details of training we need not concern ourselves, since they will vary with the particular objects

you have in view, and with your own personal idiosyncrasies ; but there are some general rules which apply in all cases.

It is well to have a preliminary medical overhaul before you take up anything very vigorous, especially if you have been slack for some time.

Enthusiasm and patience are not easily yoked together ; yet, in getting into training, *the* rule is to go slowly—and most particularly to *begin slowly*. Different people take different times to bring themselves to the top of their form ; but if you are reasonably fit to begin with, you will probably have to allow somewhere about six weeks at least. For most people brisk walking makes a good beginning, to be followed by sprint walking in short bursts with slow jog-trots in between. The increase in amount and in intensity must be gradual. The slightest sign of staleness should be a signal for easing off a little ; and you are in danger of staleness whenever you discover a lack of keenness for training exercise, or finish up without feeling the better for it.

Diet in training.—In the old days of the prize ring, training was usually preceded by a violent purging ; and the diet consisted largely of huge quantities of half-raw steak. Experience has shown this to be utterly wrong. If you are taking a clean, varied, and moderate diet, you probably need not vary it at all ; though you may find benefit from cutting down some items and increasing others, such as fruit. If you are not already on a clean, healthy diet, then you should be ; and the sooner you put yourself on to it the better !

It may be worth while to remind you that few of us drink as much plain water as we should ; and you may well correct this error.

It should be unnecessary to warn any one who knows anything about the working of the body against the folly of being strenuous too soon after a meal. Yet in spite of warnings in the Press, numbers of swimmers commit suicide every year by going into the water shortly after a heavy meal ; and a few die at other sports through the same error of judgment. It is best to have no *heavy* meals at all, but if you do have heavy meals, give them two or

three hours to "settle" before you do anything violent—and particularly before you go into the water. It is worth while to try for yourself, by actual experiment, whether your wind is better and whether you last longer, if you take nothing but the lightest food on the days when you are going to be really vigorous, and nothing at all for *at least* two hours before the actual exertion begins. You will not suffer from any lack of strength through undernourishment; you "run" on yesterday's food, and on the stores laid by before yesterday. Try this and other experiments, for individuals vary greatly; but *don't* trouble to try whether a heavy meal *just before* exercise suits you—it *won't*.

While we are talking of food, let me remind you of the un wisdom of taking a full meal when you are thoroughly fatigued. After vigorous exercise, and particularly if you are feeling done to the world, wait awhile before you eat a hearty meal: have a glass of lemonade containing two or three lumps of sugar, or some honey or glucose, and lie down half an hour or so if possible. You will then be able to enjoy *and digest* your meal. After anything except the very lightest exercise (such as a gentle walk) it is best to allow some interval for rest before eating.

Overdoing things.—There are degrees in overdoing things. If you faint at the end of some effort, or if you feel an overpowering desire for a doze, it must strike you that you have gone somewhat beyond your limit; but there are less obvious indications—slowing-up, a loss of "heart" in the game, irritability, lassitude which is not healthy (and rather luxurious) tiredness, tiredness which lasts over the following day—all these are signs of excessive exertion. It may be that you are undertaking something which is beyond your strength; or it may be that your condition is not what it might be; or you may just have carried on too long.

Naturally, you will go "all out" when you are committed to any sort of contest. There is something admirable—morally—in continuing to go all out when you are feeling "all in"; but physically it is a folly and a sin. You will be wise, therefore, to watch yourself and to make sure that

whatever you undertake is well within your powers, and that you are trained up to a proper pitch for it.

Becoming chilled.—There is often a temptation to stand or sit about without wrapping up, when you are tired and hot ; but this is looking for trouble. If you haven't finished for the day, pull on a sweater or wrap, *particularly* when you feel overheated. Too rapid cooling is dangerous. As soon as you can after you have finished, have a bath and a rub-down, and get into some dry clothes. When you cannot change on the ground and cannot walk home, wrap up really well for the ride home

SOME MISCELLANEOUS HINTS AND REMINDERS

Boxing.—Every enthusiast swears by his own pet game or sport ; but for the healthy youth, I think that one sport stands very much by itself, and that is boxing. Fitness, speed, and endurance you need for most games ; but boxing demands very much more than this. You cannot shirk, even though you feel like it—no one but yourself can get you out of a tight corner ; and when you have found the moral courage to fight doggedly right through a contest although you have discovered in the first round that you are up against your master, you are indeed a man. The risk of serious damage is almost negligible : cut lips and discoloured eyes do not last long ; and, provided that you are fit when you go into the ring, these are almost certainly the worst you will suffer. There is more likelihood of serious injury in a single game of football against a team that specialises in wicked little tricks than there is in a whole season of boxing. I hasten to add that I am *not* advocating boxing for girls or young women, for whom I consider it quite unsuitable.

I doubt very much the wisdom of deliberately getting down your weight. The professional usually slacks off between contests and puts on some lumber ; and, of course, he has every inducement to fight at as light a weight as is consistent with maximum strength ; but the young amateur should not be carrying much useless flesh, nor

is he making a business of boxing. It seems wise, from a health point of view, to train for fitness ; and if you enter for a competition, to go in at whatever weight you happen to be.

Hiking.—You travel on your feet—at least, all the best hikers do. Get your feet into trim by some walking exercise before you undertake a long trek, this is far better than relying upon soap, powders, or other artificial aids.

The choice of shoes is most important. Here you must be guided by your personal needs, but it is not a matter to leave to chance ; yet quite commonly one sees hikers—particularly women—who are uncomfortable and fatigued simply because they have been walking in unsuitable shoes. Unless you are very exceptional, you need a broad heel and a fairly low heel ; you really cannot hike on stilts. A flexible sole is much less tiring than a rigid one ; crêpe and other rubber soles give great flexibility, but many people find that rubber is too hot to the feet, and that they travel best on leather. It should be possible, nowadays, to buy a well-fitting, ready-made shoe at a reasonable price ; and such a shoe should need but little breaking-in ; nevertheless, it is taking a big risk to start a long walk in new shoes. Old shoes which have become rough inside are equally unsuitable. The happy medium is the shoe that you have proved by trial to be absolutely comfortable and which is still in good order.

Again, unless you are exceptional, a heavy shoe represents only so much extra weight ; medium weight shoes are best for most people. Let there be no rough darns in your stockings.

Don't be muffled up round the neck ; exhaustion is often due to a form of partial suffocation, due to the stagnation of air about your skin ; you need perfectly free ventilation.

Travel light—the load that weighs a stone when you start may feel like a hundredweight by the end of the day ; it is only the raw beginner who starts out looking like a Christmas tree. You may well include in your outfit a needle and cotton, a length of stout string, a bandage and

an antiseptic ointment and a box of matches in a waterproof cover. On a hiking holiday, start with easy stages, and increase your distances as you become more fit.

Camping.—You *must* have a good groundsheet; what is underneath you is far more important than what is over you. If your groundsheet is thoroughly waterproof, you can safely make up a bed of bracken or heather and have a really comfortable night on that. Anything that has plenty of airspaces—like hay, straw, or bracken—will be warmer than a closely folded blanket, since air is a bad conductor of heat.

When there isn't a really good thickness of something soft under you, you may find it worth while to hollow out the ground a bit where your hip will be resting.

Sleep level. If you choose a slope so that your head is above your feet you will be slipping down during the night; and a slope the other way is quite out of the question.

It is very convenient to camp near water; but low-lying ground is very misty, and a heavy dew will damp your things almost as much as a shower. Although mosquitoes may plague you almost anywhere, they are apt to swarm on low-lying ground where there is any stagnant water.

Ropes and canvas contract when they become damp. If you put your tent up with everything taut, it looks very neat; but rain, or even very heavy dew, may cause sufficient contraction to pull your pegs out of the ground. Some people make a hole close to the base of the upright pole and drop the pole into that when it comes on to rain; this slacks off everything, and saves the trouble of going round easing off the ropes.

Horses and cattle are apt to be a nuisance. They blunder into your ropes in the middle of the night, and may bring down the canvas on top of you; sometimes they add to their sins by becoming entangled in the ropes, and then getting wildly excited about the whole business.

Motoring.—It is well to bear in mind that fatigue increases your "reaction time"; you will not be so quick in an emergency when you have become overtired with driving, and so your liability to accident is increased. It is

unwise to do long tiring runs with insufficient periods for rest : it is not worth while to risk accidents in order to save an hour or so.

It is best to take no alcohol when you are driving. You should most certainly not take any when you are tired with driving, for alcohol takes much more effect then. After a single drink, your breath smells for some time. If you have an accident when you are smelling of drink, it may be assumed that you are somewhat "under the influence," and so responsible for the trouble. The shock of the accident, or a knock on the head, may cause you to act in such a way that you appear rather drunk ; if you smell of drink, it will be very difficult to convince people that you are completely sober.

When you travel rapidly through the air, the rate of heat loss from the body is greatly increased and you may suffer from becoming chilled. If you are short of wraps, ordinary newspaper inserted under the clothing (not next to the skin, of course) wherever possible will retard the loss of heat. Alcohol is *not* a good cure for chilling ; after the immediate glow the chilling is more rapid than before ; the best thing to warm yourself is a spell of walking, and a cup of sweetened cocoa or chocolate.

Cycling.—People who do more than potter usually adopt a crouching attitude, which brings the body more or less horizontal and gives a better pull on the handlebars. This cramped position is a drawback, especially when it is maintained for long periods and while great effort is being put forth. However, some people manage to perform wonderful feats of speed and distance without suffering any ill-effects ; it is, however, well to watch yourself for any signs of heart strain, to take hills easily, and to allow reasonable intervals of rest before and after meals.

Rowing.—Boats which are propelled by muscular power vary greatly in shape, fittings, and weight. The movements of the fisherman pulling out to his lobster pots bear little likeness to those of one of an eight : the former relies mainly on his arms and back muscles, the latter upon the thrust of his legs and upon his back muscles ; both on their forward movements give plenty of exercise to their

abdominal muscles and benefit their digestive organs. There is a certain degree of crampedness in the position, and there is checking of the breathing. Fast work is suitable only for those whose hearts are absolutely sound, and who are in perfect condition, and, with some exceptions, it is not suitable for women.

Swimming.—Swimming is one of the most exhilarating and health-giving exercises of all, particularly when it is practised in the open air; and that this is becoming recognised is proved by the recent great increase in the number of open-air swimming pools, and by the numbers of adults who may be seen learning to swim. It develops all the body muscles, and so promotes a good carriage.

It may be well to give a few of the "don'ts", some of them apply to all forms of exercise, some apply with special force to swimming, and some are peculiar to swimming.

Don't go into the water within two hours after a meal. Digestion and vigorous exercise do not go together, after a meal the blood is more or less concentrated in the digestive organs, and so the rest of the body is on rather short commons. There is liability to cramp, which no degree of skill prevents; and the results may easily be fatal.

Don't go into the water when you are tired or exhausted, or when you are sweating. When you come out of the water, the sooner you get out of your wet things and have a brisk towelling the better, unless the weather is very hot indeed: even then it is better to get into dry clothes.

Don't remain in the water too long—come out at the first suggestion of chilling, and try so to judge your capacity that you avoid even that for the future. There is extreme variation in the times which different individuals can wisely take over their dips; some begin to chill almost at once, and for them the rule must be "in and out again." If you can dive in, do so; if you cannot, then plunge right under as soon as you get into the water; creeping in will chill most people. Hot drinks—sweetened cocoa, coffee, or chocolate—after a swim help to guard against chills.

Avoid lonely places, for the strongest swimmers may

be attacked by cramp without any previous warnings. Even when you are with a party it is unwise to swim in an unknown spot, in case there are strong currents which render it unsafe. Avoid, also, carrying on to the stage of exhaustion, since in the water you cannot lie down and have a rest.

Tennis.—Tennis has increased in popularity to a truly remarkable extent in the last few years, and hard courts render it something of an all-the-year-round game. It is a splendid exercise in every possible way. There is need for warning against too exacting tournaments; the concentration of mind needed in addition to the vigorous exercise itself easily leads to undue strain and exhaustion. This is true, too, in non-competition play: one set too many will undo all the good effects of the previous exercise.

Dancing.—The actual amount of exercise in dancing is almost negligible, the atmosphere of the hall is often hot, stuffy, and dust-laden; and dancing usually means late hours. Against this there is to be set the great pleasure that many derive from dancing, and the soothing effects of rhythmic movements performed to music. It seems almost necessary to "write off" dancing as an exercise, and regard it simply as a source of pleasure.

Skating.—Roller-skating was quite a craze some years ago, but it seems to have lost ground considerably. If it could be practised in the open air it would have a great deal to be said for it; but in an indoor rink the air is usually heavily laden with dust, and the noise is nerve-lacking.

Where there is an ice rink in the neighbourhood there is everything to be said for skating; the atmosphere is cool, and there is no dust. Ice-skating gives an opportunity for enjoying the exquisite pleasures of movement to music, and few exercises are so valuable for developing grace of form and movement.

Posture and health.—A bad posture looks unpleasing and has an ill effect on the health. The slovenly attitude that we see depicted in most fashion papers, and that some young people adopt deliberately in order to look fashionably blasé, cramps the chest and distorts the spine.

If you hold yourself well, with the head well up and the shoulders thrown back, you will feel a fitter being and you will *be* a fitter being—and you will make a much better impression upon the people you meet.

A slouch is an ugly thing, even when it happens to be the fad of the moment. Few things in the universe can compare for sheer beauty with a well-built young human, who carries himself (or, of course, herself) well and moves well. Vigorous physical fitness does not always give gracefulness; certain games and other forms of exercise are particularly valuable for this purpose, and among them we must include tennis, swimming, fencing, and skating. It is stated that learning to carry a basket on your head will give you a graceful carriage, by the way.

SUN-BATHING

The ultra-violet rays.—The ultra-violet rays of sunlight are blocked, partially or completely, by smoke and fog, by clothing, and by ordinary window-glass. The maximum effect of sun-bathing is obtained by the exposure of the naked skin to bright sunshine, out of doors. You may be able to sun-bathe even in the absence of bright sunlight; for the diffuse light from a white, cloudy sky contains ample ultra-violet rays for the purposes of health.

The best colour for a sun-bathing garment is white; and the fabric should be very loosely woven, like the cellular materials used for underclothing. Of the different fabrics, artificial silk admits the greatest proportion of the rays.

In the hot weather, the most suitable times for sun-bathing are the early morning and the late afternoon, when there is a smaller proportion of the enervating heat rays. The results are best when sun-bathing is combined with movement out of doors; dancing or playing a game on the beach or in the garden is better than just lolling about. Those who cannot be out in the open may sun-bathe in front of an *open* window through which the sunlight streams, or even behind a closed window if it has a special sort of glass (such as Vita glass) which admits the ultra-violet rays.

Your sun-bathing motto must be "GO SLOW!" Exposure should be very gradual. Sunlight can burn the skin and cause the same destruction of tissue as a burn from the fire; and these burns can be very painful, as many have learnt to their cost. Increase gradually both the time of exposure and the area of skin exposed, being guided by your own reactions. People who tan well can stand longer exposures than those who freckle or redden; red-haired people with white skins are the least tolerant of sunlight. If at any stage there are signs of over-dosage—such as reddened, tender skin (the first stage of sunburn) followed by peeling, and by such general symptoms as irritability, headache, insomnia, loss of appetite, and perhaps slight fever—cut out the sun-bath for two or three days or until all the symptoms have disappeared, and then start again with shorter exposures and progress more slowly. I cannot give definite times for the sun-bathing periods, because people vary so much in their tolerance to sunlight; but start with five minutes' exposure. *The need to protect the eyes and the back of the neck applies to all*, and so a shady, wide-brimmed hat should be worn. In very strong sunlight, tinted spectacles—with Crooke's lenses for preference—will protect the eyes from the glare, and may prevent headache.

During dull weather the benefits of sunlight may be obtained by exposure to "artificial sunlight"—which is ultra-violet rays produced by "sunlight lamps." *A word of caution about the use of artificial sunlight!* There are various types of sunlight lamps on the market, designed for use in the home where electricity is available. Do remember that dosage is of the greatest importance, and should be controlled by some qualified person who knows the power of the lamp—for in a few minutes some lamps give out the equivalent of hours of strong sunlight. If you are contemplating buying a sunlight lamp for family use, do let your doctor or some other responsible person advise you. You may have an opportunity of having artificial sunlight treatment at a sunlight clinic or at a solarium during dull weather periods. If so, you should take advantage of it, not only for the immediate benefits,

but as a protection against colds and infections ; for sun-bathing in moderation increases your resistance to disease. It is to be hoped that, as the full benefits of sunlight become more generally appreciated, and facilities for artificial sunlight treatment increase, sun-bathing parties will take the place of cocktail parties all the year round.

CHAPTER VII

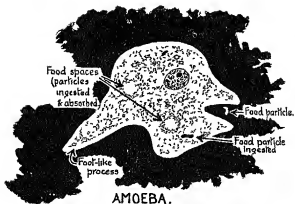
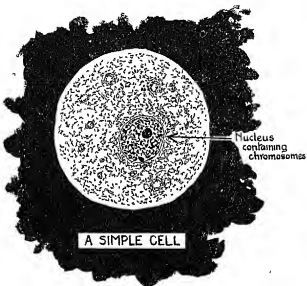
REPRODUCTION

"Every schoolboy and girl should, as an essential part of their education, receive some instruction regarding the nature, structure, and action of plant and animal organisms, as well as their relationships and actions upon each other. They should know something of heredity, and realise that every organism inherits and transmits its genetic peculiarities, down to the finest details of difference"—RUGGLES GATES.

LIVING MATTER

One great difference between living and non-living matter is that living matter can reproduce its kind. Both a machine and a human being can transform matter—fuel (petrol or food)—into heat and work energy; but a machine cannot create new machines.

It is useful at this stage to consider in some detail the structure of that unit of living matter, the "cell". The word is misleading because it suggests a little room, like a prison cell, consisting of an outer framework of walls, floor, and roof. It is true that most vegetable cells have such an outer framework—a cellulose wall—and it was from observation of this type of living unit that the name "cell" was given. As the word is in general use, I must continue to use it; but I want you to keep in mind that a living cell is a unit-mass of living matter, consisting of a jelly-like substance (*protoplasm*), with other living and non-living substances; and that the large majority of animal cells are not bounded by a visible wall. Most of the simplest animals (protozoa) and plants (protophyta) are single cells; eggs are single cells together with a collection of nutritive material. In the more complicated organisms multitudes of cells are combined into tissues and organs; the human brain, for instance, is a collection of nerve cells and supporting cells. Most cells are microscopic; but some of the single-cell animals are just visible



AMOEBA.
(A single cell animal.)

to the naked eye (*e.g.* the *amœba*), and the cells of certain plants measure several inches in length. The largest animal cells are eggs distended with the yolk, which is the supply of food material upon which the developing young must live until it is capable of independent life (*e.g.* the yolk of a hen's egg).

We must know something of the structure of a living cell in order to understand reproduction. The general cell substance consists of a living, jelly-like matter (*protoplasm*) containing granules and droplets of non-living material (nutritive substances, and excretory waste-products of the living chemical changes that are constantly taking place). In addition to this general cell substance, each cell, with very rare exceptions, contains a specialised portion, the *nucleus*, which is essential to the life of the cell—for cells deprived of their nuclei either die immediately, or else live for a short time in a crippled condition. Within this nucleus there are twisted strands of material called *chromatin*, and this substance plays a vital part in the reproduction of the cell. I shall have much to say about this *chromatin* in due course.

REPRODUCTION BY CELL DIVISION

Cells can reproduce by simply dividing, one cell becoming two cells; and the process can be repeated until the original cell has become thousands of precisely similar cells. The original cell has not died—it has ceased to exist as such, but its substance has been dispersed equally among its offspring. The actual process of cell division is an elaborate one which ensures that each of the two "daughter" cells receives half of all the essential elements of the "mother" cell—including, of course, half of the nucleus.

When the cell is preparing to divide, it narrows round its middle: the narrowing gradually increases, and at last the cell divides into two separate parts, each one of which is a perfect and complete cell. Within the cell itself, the chromatin in the nucleus arranges itself into a definite number of rod-like bodies of varying shapes which are called *chromosomes*; and "threads" become visible

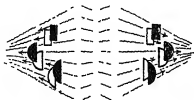
Diagrammatic representation of Nucleus Division.



The chromosomes, into which the chromatin has formed itself, arrange themselves



The chromosomes split longitudinally, and the halves move away from one another



The halves have become wholes. The two groups have separated. The two daughter nuclei are exactly similar to the mother nucleus.



(under the microscope, of course) which form a sort of spindle.

The chromosomes travel down to the middle of the spindle: they arrange themselves across this middle, and then split into two parts longitudinally. The two parts lie side by side for a time, and then move off—one set of halves to one apex of the spindle, and the other set of halves to the other apex of the spindle. Thus there is at each apex of the spindle an equal number of chromosomes (for each half becomes a whole), and each set of chromosomes is an exact duplicate of the mother cell's set.

When the division is complete—that is to say, when the cell itself has divided into two cells, each with its set of chromosomes—the chromosomes break down into chromatin again within each nucleus: so that each daughter cell is exactly the same in every way as the mother cell was before it prepared to divide. Each daughter cell absorbs nourishment, and can then become a mother cell itself and divide into two daughter cells.*

In this way, one parent cell may give rise to over a million cells in ten hours, provided there is sufficient food material for this continuous reproduction. This gives you some idea of the rapidity with which germs of disease—which are single-cell forms of life—may multiply, in suitable conditions.

I shall be dealing with heredity later on, but it will interest you now to know that the chromosomes are the carriers of hereditary qualities of various sorts.

ASEXUAL REPRODUCTION

This simple method of reproduction by splitting into two equal halves is used by most of the single-cell organisms and also by a few of the many-celled organisms, such as corals and some sea-anemones; but the usual method of reproduction of these more complicated organisms is more elaborate.

* This usual method of cell division is known as *mitosis*. You will hear later, when I describe the sex cells, that there is another method of cell division in which the full complement of chromosomes is *not* retained.

From the simple division into two equal halves have evolved two other similar methods—division into several parts, each of which becomes an individual organism (*multiple fission*); and unequal division (*budding*), in which a small portion or immature “bud” slowly grows and develops into a normal individual. Both of these methods are used by some of the single-cell organisms. Budding is the commonest method of sexless reproduction in *many-celled* animals, *e.g.* sea-anemones and jelly-fish. The buds so formed may or may not be set free from the parent organism.

In some sponges a whole mass of body cells (wandering cells which have collected together in one spot) separates from the parent sponge and begins an independent existence. This is a crude form of “budding.”

Plants display most varied methods of sexless reproduction and many of them utilise more than one method. Some detach vast numbers of single cells (spores) each capable, in a suitable environment, of developing into a new plant; mosses, ferns, fungi, and seaweeds reproduce in this manner. Some plants send out a network of strands, any portion of which may break off and develop into a new plant; and this is the alternative method of reproduction of many fungi. Some flowering plants have underground stems or “runners” which send up shoots, and a detached shoot will grow into a new plant; elm trees, for instance, can produce new individuals in this way. With some plants, when a stem touches the ground it may send out roots, and these roots, together with the stem beyond, can form an independent plant; black-berries reproduce in this way as well as by seeds. In a few cases even a piece of a leaf will give rise to a new plant; begonias and gloxinias are the commonest examples of this method. Some trees send out aerial roots from their branches, and if these reach the ground they may take root and grow into another tree; thus a single tree may, through the production of aerial roots, give rise to a whole grove of trees. You will probably remember the description of the banyan tree on “The Coral Island.”

You will notice that the processes described up to now

are quite sexless ; there is no male or female element involved. We can sum up these asexual modes of reproduction as follows :

A. *In Single-celled Animals and Plants*

1. Division into two equal parts (binary fission).
2. Division into several equal parts (multiple fission). Unequal division (budding), giving rise either to one bud at a time, or to a number of small buds discharged at once from the parent organism.

B. *In Many-celled Animals*

1. Various forms of fission.
2. The formation of buds which may or may not be set free
3. The separation of masses of body cells (a form of budding).

Asexual reproduction, then, is really a special form of growth, in which the new material, which usually detaches itself from the parent body, develops into a new individual.

The simple sexless method of carrying on the species has served the simplest living things from the very beginnings of life to the present day. The bacteria, for instance, have no other method of reproduction.

Conjugation.—Other organisms show a very interesting phenomenon which, though unrelated to reproductive growth, really represents the beginning of sexual union. This is known as *conjugation*, or the coming together of two individuals either to fuse completely or to exchange portions of their nuclear material. The exact purpose of this is not certain ; but it appears to rejuvenate the species. Conjugation does not take place between near relatives ; in an isolated colony, reproduction by simple division of one cell into two cells has been observed to produce over two hundred generations, and the stock then became so debilitated that it was unable to absorb nourishment or to continue reproduction by simple cell division ; the colony had exhausted itself. But it was found that, when several of these " senile " individuals were restored to their natural conditions so that they could meet with unrelated individuals, conjugation took place and healthy colonies resulted.

Here, then, we have examples of two cells fusing together—a sort of rejuvenating process—in organisms

which reproduce by simple fission, and in which the occasional conjugation of two individuals appears to be necessary to revitalise the stock.

SEXUAL CONJUGATION

. Now let us trace the fusion of two separate cells for the purpose of reproduction—the beginnings of sexual reproduction. *In sexual reproduction, the new individual is the product of the fusion of two different kinds of cells, neither of which can develop without fusion with the other, but which together give rise to a new individual.*

Sexual reproduction almost necessarily involves the existence of special cells to which the task of reproducing the species is delegated. These special cells are called *gametes* (or marrying cells). In the simplest forms of life, the two gametes are of equal size and appear quite similar in other respects, so that we cannot say that one is male and the other female—their mating process appears to be without distinction of sex into male and female. Usually, however, the gametes or marrying cells are distinguishable as being of two kinds—a smaller more active cell (the male gamete (*sperm*)), and a larger passive cell (the female gamete (*egg or ovum*)); but there is every gradation from the apparently similar sexless gametes to the typical male and female types. These reproductive cells take no part in the building up of the rest of the body of the individual; their descent is continuous from the original germ cell from which the parent arose, and the qualities of the organism are inherent in them. This explains why a child inherits certain characteristics of its ancestors.

SEXUAL REPRODUCTION

This liberation of special cells is an economical improvement on the more primitive methods of reproduction by asexual fission or budding, both of which would obviously be quite unsuitable for the more complex organisms in which there is great specialisation of cells into tissues and organs for the division of labour. You have only to reflect on the difficulties of a human being splitting into two halves, each of which formed a complete human being.

Another advantage of sexual reproduction in which the two gametes are from different individuals is that it affords an opportunity (by mixing of different stocks) for variation in the species. Against this, the rate of reproduction is considerably slowed: two individuals are required to produce one, instead of one producing two.

We have yet to account for the fact that most animals are either males (producing the small active male gametes) or females (producing only the larger, passive female gametes); and that these two kinds of reproductive cells usually do not develop into new individuals unless they combine—that is, unless the egg cell is fertilised by the sperm. This stage, in which male gametes are produced by male parents only, and female gametes are produced by female parents only, is the final stage of sexual differentiation.

There are intermediate stages in which the same parent body produces both kinds of gametes, the smaller active sperms and the larger passive eggs; it is a combination of male and female. Many of the lower forms of plant and animal life are of this kind: and most of the commonest flowering plants produce both male and female gametes—male gametes or *pollen grains* in the anthers and female gametes or *ovules* in the ovary; the fertilised ovule forms the plant *seed*.

It is an interesting fact that some of the lower forms of life use both types of reproduction, asexual and sexual, according to the food supply and general environment. For instance, *Volvox*, a primitive organism found in fresh-water pools, is composed of a ball of cells. From this collection of cells, reproductive cells are sometimes set adrift, to form new individuals by simple division of cells; when the food supply becomes diminished so that nutrition is checked, a less direct method of reproduction occurs. Some of the cells become large, well-fed egg cells; others divide into clusters of the small active sperm cells some of which fuse with (fertilise) the egg cells. Thus, in the same individual, both male and female gametes are formed in different parts of the "body," and

sexual reproduction occurs by union of a sperm and an egg. Yet a further variation is found in which some *Volvox* balls produce only the male sperm cells. Here we have the sexual differentiation of the parent organisms into males and females, the egg-producing *Volvox* is called female and the sperm-producing *Volvox* is male. Occasionally, also, a *Volvox* will produce egg cells which develop without fertilisation (parthenogenesis).

This simple organism, which is on the borderland between plant life and animal life, illustrates the beginning of the important distinction between body (*somatic*) cells and reproductive (*germ plasm*) cells; and it utilises asexual, bisexual, and unisexual methods of reproduction.

VARIATIONS FROM NORMAL SEXUAL REPRODUCTION

In normal sexual reproduction, mother cells (eggs) from females are fertilised by father cells (sperms) from males, so that the resultant offspring has a mother and a father, each of which has contributed certain material. Before proceeding to consider this normal process in detail, it will be of interest to describe some variations from it.

Hermaphroditism (both sexes in one individual)

Where the male and female sexual functions are combined in one individual, as in some sponges, in many worms (including the common earth-worm and the leech, in barnacles, in one species of oyster, in snails, sea-squirts and hagfish, and in most of the common flowering plants), the organisms are called *hermaphrodites*. The name is derived from the two mythical characters, the male Hermes and the female Aphrodite, whose bodies became blended. In some plants, both unisexual and hermaphrodite flowers are present. In some creatures hermaphroditism occurs in very early life only, and disappears in the adult as maleness or femaleness predominates. In many unisexual animals (*e.g.* frogs and birds) hermaphrodite organs occur as a transitory stage in the development of

the embryos. It is rarely that the eggs are fertilised by the sperms of the same parent body; cross-fertilisation is the general rule. Self-fertilisation does occur, however, among certain parasites, such as tape-worms and flukes, in whose case cross-fertilisation would be difficult; and

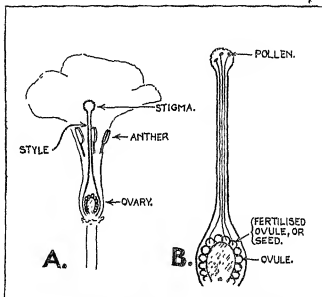


DIAGRAM OF HERMAPHRODITE FLOWER
(PRIMROSE)

A. shows section of flower bearing male organs (anthers) and female organs (ovary, style, and stigma).

B. shows pollen grains which have been carried by some insect from the anthers of another flower (for cross fertilisation) to the stigma. The pollen grains have sent down "pollen tubes" along which the male gametes (sperms) travel down to the ovary to fertilise the female gametes (ovules).

it is not uncommon for some plants to be fertilised by pollen from the same flower.

Apparent hermaphroditism in humans.—You may have heard of human beings who are said to be herma-

phrodites, as they combine both male and female sex characteristics. Such cases give rise to much confusion. At birth, the infant may appear to be most like a female, judging from the external sex organs, and the child is brought up as a girl; later on, usually about the age of puberty, definite male characteristics begin to show themselves in behaviour and appearance, and apparently the child changes sex, although the external sex organs remain abnormal, resembling the female more than the male. Usually in such cases the "girl" has to adopt male clothing and continues life as a male. There are no true human hermaphrodites—such cases as the one I have described are really males with maldevelopment of the external genital organs, so that as children they are mistaken for girls.

Parthenogenesis (virgin reproduction)

You may be astonished to hear that some animals and plants have mothers but no fathers. In normal sexual reproduction, the female gamete (egg) cannot develop unless it is fertilised by a male gamete (sperm). It is one of the most interesting facts in biology that the females of some species have dispensed with this necessity for male co-operation in reproduction; the females produce eggs which, without fertilisation by a male gamete, develop into adult individuals; this virgin reproduction produces fatherless offspring and the process is known as parthenogenesis. In one sense this resembles the asexual method of liberating a reproductive cell, which then develops into a new organism, as in the case of the sexless spore-production of ferns; but the distinction is that in parthenogenesis the parent body is definitely a female, whereas the parent body which produces the spores has no sex. Parthenogenesis occurs in rotifers, the beautiful minute animals found in fresh water and in the sea; in some species of these, males have never been discovered; in others, the males are small, degenerate creatures, and the majority of the eggs develop without being fertilised. Greenflies, the "blight" found in colonies on rose and fruit trees, reproduce by parthenogenesis as well as

sexually : throughout the summer a number of generations are produced without the aid of the male, while a sexually produced generation appears in the autumn. The probability is that the clusters of these tiny parasitic pests which you see on your fruit trees in the summer have neither father, nor grandfather, nor great-grandfather ! Water-fleas and some flowering plants can reproduce without fertilisation by a male. The drones in the beehive are developed from unfertilised eggs—the queen bee is the mother, but they have no father. In the Zoo, many generations of stick insects have been produced by parthenogenesis.

Parthenogenesis in the laboratory.—These are examples of parthenogenesis in nature ; but biologists have succeeded in producing artificial parthenogenesis in eggs which normally need to be fertilised, and healthy fatherless sea-urchins, worms, snails, star-fish, and tadpoles have been produced and reared to the adult stage. In nature, the eggs of these creatures never develop unless they have been fertilised by a male gamete (sperm). What, then, has taken the place of normal fertilisation in this artificial parthenogenesis ? It is found that various physical and chemical stimuli will do the work of the father cell in activating the egg to develop and form a new individual—in some eggs, heat or shaking is required, others need to be pricked with a needle dipped in blood ; others require the addition of certain chemicals to the water which surrounds them. These chemical and physical agents cannot, of course, do the *whole* work of the sperm : they cannot contribute the germ plasma of another line of individuals. Whether it will ever be possible to achieve this fatherless method of reproduction in such higher animals as horses or dogs or man is extremely doubtful, as the egg cells are developed within the mother and are not readily accessible for experiment. Even if this were possible, however, the individual so produced would differ very materially from one produced naturally by the fusion of the ovum and sperm, because it would not have received any germ plasma from a father stock.

Extreme variation between male and female parents

In some species the male is very much smaller than the female, and quite degenerate. For instance, the female of *Bonellia*—a beautiful green worm which lives in holes in the rocks on the warmer coasts of Europe—is about the size of a plum, but the male is a microscopic pigmy, not visible to the naked eye; he has no mouth, and his body cavity is almost obliterated—he is little more than a bag of sperms, and he lives as a parasite within the body of a female. The fertilised eggs of this interesting worm hatch out as free-swimming larvæ. Those which settle on the bottom of the sea grow into females; but those which happen to settle upon the long, grooved trunk-like proboscis of a female worm develop into males, and enter her body through the mouth, and thence make their way to her reproductive tract. Here, within her body, they settle down to play their part in producing the father cells (sperms) necessary for the fertilisation of her egg-cells.

A less marked and opposite variation is that of the common vapourer moth, which is to be found swarming around the trees in streets and parks, and in several other moths. The male has the normal wing development and has a strong and rapid flight, but the female is a sluggish flightless (the wings are rudimentary) creature which sits on a tree trunk or fence and awaits the active male. She neither eats nor flies—she is little more than a bag of eggs.

Change of sex (sex reversal)

It is well known that many of the sexed organisms may change their sex; and that some may even revert back to their original sex. The usual order of this phenomenon is:

male > hermaphrodite > female > hermaphrodite > male

The native oyster begins life as a male, and during its second year of life it commonly changes into a female which, after shedding its eggs, may change back into a male. Other forms of life in which this sex reversal has

been observed are star-fish, slugs, fowls, ring-doves, toads, and the sword-tailed minnow.

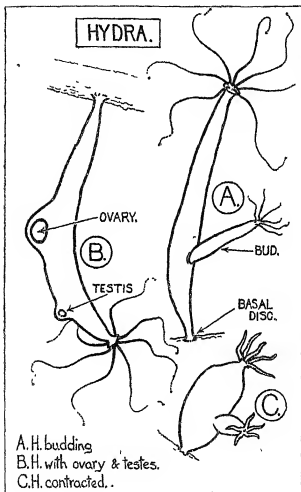
These remarkable changes appear to be due to the action of the sex hormones—the chemical messengers which I described in the chapter on Physiology.

Alternation of generations

Certain forms of plant and animal life, in their normal life history, show a definite rhythm between asexual and sexual reproduction, and between parthenogenesis and normal sexual reproduction. They demonstrate the alternate occurrence in one life cycle of two (or more) different forms differently produced. I will describe some examples.

HYDRA—The hydra is a tiny animal that lives in fresh water and is usually fixed to stones or aquatic plants—look on the lower surface of duckweed if you wish to find some. It provides the simplest example of alternation of asexual and sexual generations. The body is a simple tube of two layers of cells—an outer and an inner layer—enclosing a central food space. There is a ring of tentacles round the open upper end (mouth), and the animal attaches itself to something by its lower end or base. It has no organs, except on the occasions when it develops sex cells. When stretched out it measures not more than half an inch in length and is as thin as a needle; but it may contract itself into a tiny blob. It feeds on minute water creatures that are killed or paralysed by the stinging cells on its tentacles and are then swept along into the body cavity by the aid of the waving tentacles and moving hair-like structures (flagellæ) on the inner layer of cells. If you are fortunate you may see one of these fascinating little animals struggling fiercely with a small worm or with a water-flea.

(a) *Asexual reproduction of hydra*.—The creature itself is sexless—neither male nor female. When the conditions are good, and the food supply ample, hydra simply forms buds, and a second generation of buds may form on this first generation of buds; and if food becomes short, or other adverse conditions arise, the buds are set adrift from the parent plant. Sometimes a hydra may



split across the middle, and each half may grow into a complete hydra in a few days. These, then, are its *asexual* methods of reproduction.

(b) *Sexual reproduction of hydra*.—At other times, sexual reproduction occurs. The parent hydra develops two little swellings in its outer layer or cells, one swelling near the tentacle end and the other near its base. These swellings are made by two collections of cells which at first look exactly the same as the rest of the outer body cells. Soon, however, the cells of the upper group develop into sperms or male gametes, each with a long thread-like projection or "tail" by means of which it swims about freely, when it is set free into the water.

The swelling in which they are formed is a male gland (*testis*). The lower swelling or nest of cells is the female reproductive organ (*ovary*), and a single cell in the centre of this clump develops into the ovum (egg) or female gamete. This egg is not set free into the water; but the cell layer over it breaks down in one spot and leaves a hole, through which one of the sperms or father cells swims to fertilise the egg. When the sperm and egg have fused, a new hydra begins to develop and in due course is detached from its parent. At this stage in the life history, hydra has become hermaphrodite, producing both male and female sex cells, and reproduction is therefore sexual. After liberation of the sexually formed offspring the testes and ovary of the parent hydra disappear.

Here, by the way, is our first example of definite *sex glands*—the testes (sperm producers) of the male and the ovaries (egg producers) of the female. These glands become much more complex in the higher forms of life.

LIVER-FLUKE.—Another interesting example of alternation of sexual and asexual reproduction is the liver-fluke, the parasite which causes the disease of liver-rot in sheep, and which in some years causes the death of over a million sheep in Britain alone. The adult fluke (which lives in the liver of a sheep) is hermaphrodite, producing both eggs and sperms; and the fertilised eggs develop into free-swimming larval forms which have to find their

way into a water-snail if they are to survive and continue the life cycle. Within these sexually produced embryos, at a further stage of the life cycle, some unfertilised cells develop (by a process resembling parthenogenesis) into a totally different form of embryos, and these are liberated to continue asexual reproduction for two or more generations, until finally the adult sexual fluke appears again. Thus in the life cycle of this parasite we have sexual reproduction followed by two or more generations of asexual reproduction.

MOULD FUNGUS.—In the plant world we find a combination of sexual and asexual reproduction represented by the common mould fungus which forms white, fur-like growths on damp bread and on the surface of jam.

If a tiny portion of this fungus is examined under a microscope, it is seen to consist of a network of branching threads, with here and there a long upright branch ending in a rounded knob. This knob is really a bag of non-sexual reproductive cells (spores) which, when fully developed, are set free by the bursting open of the outer wall of the spore case. Each of these cells, which are neither male nor female, can in suitable conditions develop into the adult form of the fungus: there is no conjugation or fertilisation—the process is *asexual*.

The sexual form of reproduction is illustrated by other upright branches ending in knobs; but you would observe that these branches arise not directly from one of the branching stems (as do the asexual forms), but from globular swellings with rough, irregular surfaces, which have formed in this way: two lateral branches of the fungus plant, which have developed thickened, club shaped ends, come together so that the thickened ends meet and gradually fuse together. These ends contain the male and female gametes (sperms and ova) respectively, and the joining of the branches and the subsequent breaking-down of the intervening wall enables fertilisation to take place. This leads to the formation of one of the globular swellings with the rough, irregular, thickened wall which encloses the fertilised ovum (*zygospore*). After a period of rest, germination begins and an erect branch grows out

of the zygospore and develops at its tip the rounded sac of reproductive cells or spores.

Thus we have, in this fungus, the two types of spores—those produced asexually from a simple branch thread, and those produced sexually from the fusion of male and female sex cells.

FERN.—The common male fern is a sexless plant which produces reproductive cells (spores) in the little brown bodies on the under-surface of the leaves. Each of these spores develops into a tiny intermediate plant (prothallus) which is hermaphrodite, producing both eggs and sperms; and the new fern develops from the fertilised egg-cell of the prothallus.

Regeneration

Most people know that if an earthworm is halved with a spade during digging operations, it does not necessarily die; for the head portion may grow a new tail and the tail portion may grow a new head complete with a brain. Many of the simpler forms of animal and plant life show this remarkable property of regeneration of parts into complete individuals, which is really a combination of repair and sexless reproduction. Some of the flat worms that live in moist earth (planarians) have so much regenerative capacity that half a dozen or more may be produced by cutting one into pieces. Reproduction is here quite incidental to the repair process. Man makes use of regeneration when he plants slips and cuttings of plants to produce new plants.

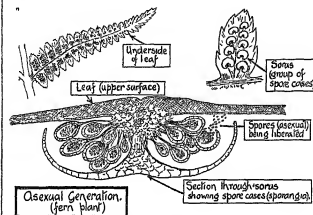
THE MECHANISM OF SEXUAL REPRODUCTION

The gametes or marrying cells

All plants and animals that reproduce sexually are the result of the fusion of two cells, the female gamete (egg) and the male gamete (sperm). The product of this union of male and female gametes is a fertilised ovum, or *zygote*, as it is called by biologists. All sexually produced organisms began their development as fertilised eggs, the eggs being produced by the mothers or females of the species, and the sperms by the fathers or males of the

MALE FERN.

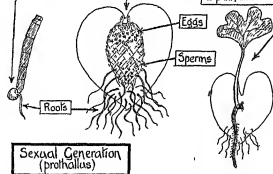
Alternation of Generations.



Spore germinating to produce gamete-bearing prothallus

Prothallus (under surface) bearing sex cells. (bisexual)

Young fern plant growing from fertilised egg-cell still attached to prothallus



species. Thus you, your dog and your cat, the cricket on your hearth, the goldfish in your pond, the daisies on your lawn, the robin singing in the tree, and also the tree itself, all began life as *zygotes*. In these wonderful reproductive cells, the qualities of the parents are inherent; the gametes take no part in the building-up of the general body structure—they are continuous in quality with the original germ plasm from which the parents and grandparents and all the other ancestors arose, and they are to a large measure protected from the taints and mishaps that may befall the body which houses them.

The female gamete or ovum is a relatively large cell, and has the usual characters of a cell—including protoplasm, nucleus, and chromatin material; and in addition it often has a store of reserve material or yolk (stored food) for the growing embryo. In the eggs of birds, reptiles, and most fishes the yolk is so copious that the living protoplasm forms but a thin film on the surface of the yolk and a small concentration at one pole of the egg, and the egg white and the shell are merely cell wrappings. The actual size of the egg depends chiefly upon the amount of food material it needs to store.

In mammals, where the mother's blood supplies practically all the food for the developing offspring, the amount of yolk is relatively small. Some mammals and flowering plants have microscopic eggs only $\frac{1}{250}$ inch in diameter: from this there are all sizes up to eggs as big as a human fist. Some prehistoric creatures produced eggs which were as big as a football. The human egg is only just visible to the naked eye.

Round the egg-cell there are usually coverings of various kinds, sometimes a thin, delicate membrane, in other cases a firm harder envelope with one or more tiny holes to allow the male gamete (sperm) to enter—as is the case in the eggs of many insects. The hard shell round the eggs of birds, snakes, and tortoises, etc., or the mermaids' purse enclosing the egg of a skate, are formed *after* the sperm has fused with and fertilised the egg. Sometimes a number of eggs are wrapped up together in a sort of capsule or cocoon, e.g. those of earthworms.

With few exceptions, the mature egg is round and passive ; its only sign of activity is to send out a zone of its protoplasm towards an approaching sperm, when fertilisation is imminent.

The male gamete or sperm is a much smaller and a much more active cell than the egg-cell and is of very varied appearance ; essentially there are, with few exceptions, three distinct parts—the *head* consisting mainly of the cell nucleus, a mobile propelling *tail* and a small *middle portion* between head and tail. The head may be rounded, flattened, globular, long and cylindrical, or corkscrew-shaped ; the tail may be a single thread, long or short, it may have attached to it a thin protoplasmic “ frill ” or—as in plants—there may be two tails or whole masses of them, forming a fringe at the head or distributed in various patterns. Some sperms have lost their primitive power of movement ; the pollen of the flowering plant depends upon insects or the wind to carry it most of the way to its destination, for instance. The sperms of round worms, crayfish, and other crustacea are very sluggish indeed. The majority of sperms, however, are in constant movement, swimming in the body fluid in which they are suspended, or in the water into which they have been expelled, or along a moist surface within the reproductive tract of the female, restlessly seeking the complementary egg cell

The sperm or father cell has two distinct functions. It supplies the essential stimulus which activates the ovum, enabling it to proceed with the formation of an embryo ; and it contributes material (germ plasm) from the father stock.

Fertilisation (the conception of a new life)

In all forms of life, fertilisation occurs only when the sperm meets and fuses with an ovum ; and this essential meeting of the sex cells is brought about in various ways. In some cases (in fishes and many of the simple animals and plants), both sperms and ova are liberated into the water, and have to take their chance of coming into contact. In other cases, the sperms alone, in vast numbers, are liberated from the parent and have to find their way to

the ova, which are retained within the female parent organism. Thus, the anthers of flowers split open and release a shower of pollen grains, which normally depend

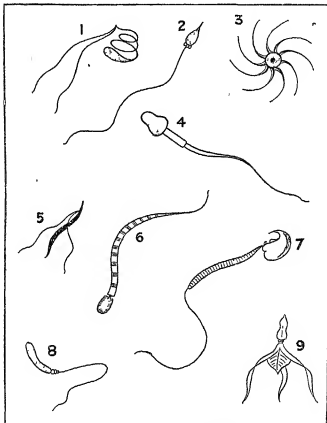


DIAGRAM OF SOME MALE GAMETES (SPERMS).

1. Moss
2. Sea-urchin.
3. Crayfish.

4. Man.
5. Flat-worm.
6. Bat.

7. Field-mouse
8. Frog.
9. Squat-lobster.

upon insects or upon the wind to carry them to the stigma of another flower (for cross-fertilisation is the general rule), whence they grow their pollen tubes down the style to reach the ova (ovules) in the ovary of the flower. In some sea-worms the death of the parent is the inevitable penalty of the liberation of the sex cells, for the whole body bursts. In other species the whole of the posterior part of the body, which is distended with eggs or sperms, is simply shed complete, to burst in the water and release its contents; and subsequently the head end grows a new posterior part, to repeat the whole process the following year.

You will notice that here there is no pairing of the male and female—the parent bodies do not come into contact; one or both of the sex cells behave as independent living creatures once they are liberated, and fertilisation may take place at a considerable distance from the parents, through a chance meeting of sperm and ovum.

A further stage in the evolution of sexual reproduction is represented by those organisms which seem to need the proximity of the two sexes as a stimulus to the release of the sex cells; this stage is commonly found in fishes. When the female salmon drops her eggs into the furrow she makes in the gravelly bottom of the stream, the male immediately sheds his "milt" (fluid containing the sperms) upon them.

The next stage is where contact between the parents does occur, but the sperms and ova are shed from the body and fertilisation takes place externally: the sperms are not deposited within the body of the female. An example of this sex contact is found in frogs. The male frog clasps the female in a close embrace, and sheds his sperms as she liberates her eggs from her body. The clusters of fertilised eggs—frog spawn—in pond water in the spring are a familiar sight.

You will notice that the stages show a trend towards facilitating the meeting of the sex cells; and a still further advance is reached when pairing takes place, so that the sperm cells are deposited within the body of the female. This process is called copulation, and it is characteristic of the sex act in most of the higher animals and in man.

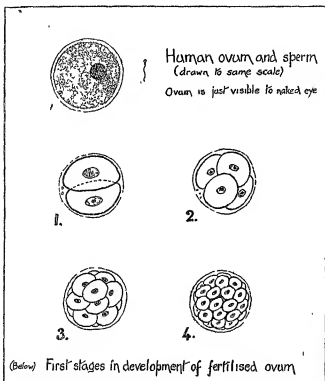
The sperms from the male are ejected into the body of the female either by mere apposition of their genital orifices (as in the fowl), or by means of an external prolongation of the male sperm tube (which forms an organ called the penis) which is inserted into the female's genital aperture (as in the dog, cat, horse, etc.). In both cases copulation takes place between the parents; and the result is that the chances of a meeting between sperms and ova are at a maximum.

DEVELOPMENT OF ZYGOTE (FERTILISED OVUM) TO FORM EMBRYO

When a sperm has entered the ovum, the latter ceases to be receptive to other sperms. The nucleus of the ovum fuses with that of the sperm—thus the offspring starts with an inheritance, a pooled contribution, from both parents. The zygote so formed by the union of sperm and ovum immediately begins to grow by cell division, forming a ball of cells something like a miniature blackberry; then a cavity forms, and the cells arrange themselves into a double layer surrounding this cavity. Further differentiation begins to take place, according to the particular species from which the zygote has originated and into which it will develop. Thus all the many-celled animals produced by sexual reproduction have to begin at the beginning—as zygotes. When the zygote proceeds to grow and develop, it becomes an *embryo*. In the very early stages, the embryos of many of the higher vertebrates (including man) resemble one another: in fact, it may be extremely difficult to identify them.

Recapitulation of evolutionary history.—One very interesting fact about the embryonic stage, is that individual animals develop along a path which corresponds to some extent with the steps of ancestral history—we all recapitulate in some measure the evolutionary history of our race. The single-celled zygote corresponds to the unicellular organisms (*e.g.* *amœba*); at the next stage, the clump of cells corresponds to the next simplest organism, the ball of cells (*e.g.* *volvox*); then the differentiation of the embryo into a two-layered sac of cells corresponds with

the more complex organism of similar structure (*e.g.* hydra)—and so on. Progress in development is from a general to a special type. For example, the rat begins like all living matter, as a single cell—a zygote. As development



The ovum may be fertilised by a sperm in the upper end of the egg tube. The head of the sperm enters the ovum and swells up into a typical nucleus. The zygote takes about a week to travel along the tube to the womb, and during this time it is developing rapidly by simple cell division. By the time it reaches the womb it has become a mass of some hundreds of cells which have arranged themselves into a hollow ball with a thickened lump projecting into the cavity at one point. The zygote now burrows into the wall of the uterus so that it is bathed by the mother's blood, from which it extracts nourishment, and from this stage, growth in size as well as development begins to take place.

proceeds it resembles first the early embryonic stage of any simple vertebrate ; later it would be possible to identify the embryo as that of a mammal, and later still as that of a rodent ; finally it becomes unmistakably a young rat. As Haeckel remarked, the development of the individual is a shortened recapitulation of the evolution of the race. In the case of the human embryo, there is at certain stages a resemblance to the *embryonic* stages of the different forms of life along our own evolutionary path ; for instance, the human embryo at one early stage of development has gill clefts (suggesting the gill development of a fish) and a tail. Of course, the human embryo is never like the adult worm or fish or reptile—there is only a resemblance in some particulars to the early embryonic forms of these creatures.

Early isolation of reproductive cells.—At an early stage in the development of the embryo, the future reproductive cells are set aside from those which will form the main body. The body or *somatic* cells prepare for the division of labour by developing into specialised tissue cells—muscle cells, secreting cells, nerve cells, etc.—and lose their physical resemblance to the zygote from which they have originated. The reproductive cells retain intact the qualities of the fertilised ovum, and they take no part in the general structure or functioning of the body, nor are they affected by any ordinary conditions of environment which affect the body cells. They are the potentially immortal germ plasma, and when sexual maturity is reached, they produce the fully developed sex cells (gametes). When the primitive sex cells are grouped together they form, together with the supporting structures, the sex glands—ovaries in the female and testes in the male.

HEREDITY

It is a matter of common observation that children show varying degrees of resemblance to their parents, grandparents, and other blood relatives in appearance, mannerisms, and so on. We know that a child develops from a union of the two gametes, an ovum and a sperm ; and therefore it follows that in some way the different

characteristics, height, features, colour of eyes and hair, ability or weakness, mental qualities and other inherited characters that go to make up an individual, must be carried in these two parental sex cells. The same is true of the sex cells of animals and plants.

Mendel's work.—Before the discovery of the microscope it was not possible to know anything about the minute structure of a cell, or whether there appeared to be a structural difference between the body cells and the sex cells which transmitted the hereditary characteristics of an individual. Gregor Mendel, an Austrian monk (1822-1884), who knew nothing of the microscopic appearance of cells, carried out some simple experiments in the breeding of different strains of peas; and from this work he deduced that the sex cells contain "something" which determines characteristics, and that this something is transmitted from generation to generation according to definite laws. We owe to this monk, who lived and died in obscurity, the basis of our knowledge of the laws of inheritance; for since the publication of his great work—a description of his breeding experiments showing definite laws of inheritance—biologists, with the aid of powerful microscopes and by much experimental work, have proved that Mendel's deduction was right, and they are now able to describe the mechanism of heredity. Certain common laws of heredity are named after their discoverer: they are known as the Mendelian laws.

Let us go back for the moment to the microscopic structure of a cell. You will remember that when a cell is highly magnified, it is seen to be more than a simple homogeneous unit of protoplasm; it has a special structure—the nucleus—which is essential for the life of the cell, and within this nucleus there is some of that remarkable material named *chromatin*. When a cell is about to divide, this chromatin forms itself into a definite number of short rod-like bodies called "chromosomes," and the number and shape of these rods is absolutely constant for each species. Outfits of chromosomes varying from two to over two hundred have already been noted: in man there

are 48 chromosomes, in a mouse 40, a fowl 36, in a potato 24, in the fruit-fly 8, in the greenfly 3, and so on.

When one of the somatic cells (ordinary body cells) divides into two cells, it behaves in the ordinary way which I have described. Each chromosome splits equally into two halves, so that each of the daughter cells receives the same number of chromosomes (for each half becomes a whole) as the parent cell—the characteristic number for that species. Thus the number of chromosomes for each species is kept constant. You will remember that cell division of this type is called “mitosis.”

Now let us consider the special case of the *sex* cells. The fertilised ovum, the cell from which a new being ultimately develops, is really a fusion of two cells (the ovum and the sperm) which are produced by the germ plasm (gamete-producing cells) of the parents—that part of an individual which is set aside at the moment of fertilisation for the carrying on of the species and the transmission of the hereditary qualities. The germ plasm which will be handed on to our children will be exactly the same as that which we received from our parents, and it will live on in them and be passed on to their descendants, while the rest of our bodies and of their bodies, which have in turn housed and nourished the germ plasm, will in due course die and disintegrate. This is what is meant by “the continuity of the germ plasm”: in one sense it is potentially immortal. This wonderful germ plasm is housed in special organs, the two ovaries in the female and the two testes in the male. The sperm-producing and egg-producing cells to which it gives rise, behave differently from the body cells during the process of cell division which is to prepare for the ultimate fusing of sperm and ovum.

I have said above that when a body cell is about to divide into two daughter cells, it doubles its number of chromosomes (by the splitting of the chromosomes), so that each of the daughter cells may receive its normal complement. Thus, if a human muscle cell is about to divide into two muscle cells, its 48 chromosomes split into halves, forming two sets of 48, so that each daughter cell receives one set of 48 chromosomes—the normal number for the species.

If each of the gametes had the full complement of chromosomes, their fusion (when the sperm fertilises the ovum) would give the zygote (fertilised ovum) twice the normal number of chromosomes; but, in fact, this does not occur. It is obvious, then, that at some stage in the formation of ova and sperms the number of the chromosomes must be reduced; and this is achieved by a special "*reduction division*" of cells from which the ova and sperms originate. These human gamete-producing cells, each containing its 48 chromosomes normal for our species, divide, by "*reduction division*," and ultimately produce gametes which contain only half of a full complement of chromosomes. Thus when a male gamete and a female gamete fuse together to form a zygote (*fertilised ovum*) at the moment of conception, each gamete contributes its half complement of chromosomes, so that the zygote has a full complement, and no more, from the very beginning. Since the hereditary qualities are carried by the chromosomes, it is plain that the zygote takes half from the ovum (that is, from the mother) and half from the sperm (that is, from the father).

The diagram will make this clear to you.

STRUCTURE OF CHROMOSOMES

You will remember that the gametes each provide the zygote with a half complement of chromosomes; and also that the chromosomes are the carriers of hereditary qualities. I will now describe to you what is known of the structure of the chromosomes so as to give you some idea of the actual mechanism of heredity.

The genes.—The chromosomes carry units, called *genes*, which we can regard as the "atoms" of the germ/plasm. The genes persist unchanged and indefinitely, through generation after generation, carrying the factors which determine colour of hair and eyes, height, features, shape of hands and feet, mental qualities and all the various characteristics that constitute the resemblances and the differences between members of the same species.

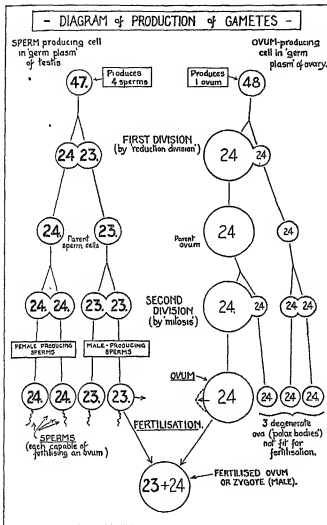
In the group of genes which determine any particular quality (*e.g.* colour of eyes or mental development) some

may be *dominant* to others, which are said to be *recessive* so that if any one inherits dominant genes and corresponding recessive genes, it is the former only which will manifest their effect. The recessive genes *appear* to be non-existent ; but as a matter of fact they are simply " masked," and, so to speak, dormant within the individual ; but they may be passed on to the next generation and, if there are then no dominant genes present to mask them again they will take their full effect.

An example will make this clear. In the colouring of the human eye, the brown-colour gene is dominant to the blue-colour gene : so that a brown-eyed person may have inherited either two pure brown-colour genes, or one brown-colour gene and one blue-colour gene. Two blue-eyed people cannot have a brown-eyed child, since neither has a brown-colour gene to pass on to him ; but two brown-eyed people may have either a brown-eyed child or a blue-eyed child, for each may have a (recessive) blue-colour gene, and each may pass that colour gene to their offspring, so that both his colour genes are blue. If one of them passes on a brown-colour gene and the other a blue-colour gene, his eyes will be brown, since the brown-colour gene is dominant to the blue-colour gene.

It will be seen that, in the case of human eye colour, the person who is really a " hybrid " (possessing one brown-colour gene and one blue-colour gene) shows the same colour as the pure brown (who has two brown-colour genes). In some cases, however, a hybrid differs from either " pure " parent : a hybrid between a white Four-o'clock flower and a red Four-o'clock flower is pink ; but these pink hybrids will not " breed true " with one another : a quarter of their offspring will be (pure) red, a quarter (pure) white, and a half pink (red and white) ; and these hybrids again will produce red, white, or pink offspring in the same proportions.

Thus, at the moment of fertilisation, we are equipped with a set of chromosomes bearing hereditary factors (genes), and this determines to a large extent our " nature " —the kind of person we are to be. The external influences —our environment (surroundings, education, occupation)



—which act upon us after conception, we speak of as “nurture.” Although the power of heredity is so irrevocable, we must not forget that it is in our own power to encourage the development of our good characteristics and to discourage traits and characteristics that are undesirable; for we are all, I imagine, like the curate’s egg—good in parts. Our heritage of possibilities we cannot change; but what we make of our qualities is very largely in our own hands. We can to a large extent modify and control our “nurture.” The final result will be the product of our heredity (“nature”) and environment (“nurture”); and as we cannot alter heredity, it behoves us to concentrate on seeking the best possible environment so as to make the most of the material with which we are endowed.

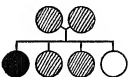
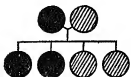
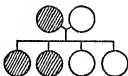
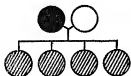
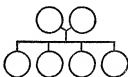
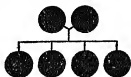
DETERMINATION OF SEX

I have spoken of forty-eight as being the number of chromosomes in the human cell; but I now have to say that this is not strictly correct, but has been said so far in order to avoid confusion. It seems to be established that in man (as in most mammals) only the female cell has the full complement of chromosomes, while the cells of the male have one less. When, therefore, *reduction division* occurs in man, so that the gametes are provided with a *half* complement, each ovum takes twenty-four chromosomes; but of the sperms, half take twenty-four and the rest twenty-three. The sperm which fuses with the ovum to form the zygote may therefore have either twenty-four or twenty-three chromosomes. If it happens that a twenty-four chromosome sperm fuses with the ovum, the zygote will have forty-eight chromosomes and the child will be a female; but if it happens that a twenty-three chromosome sperm fuses with the ovum, the zygote will have forty-seven chromosomes, and the child will be a male.

As the number of twenty-three chromosome sperms will be the same as the number of twenty-four chromosome sperms, the chances of a child’s being a male or a female appear to be equal; but there *may* be conditions present

- DIAGRAM of MENDELIAN INHERITANCE -
SHOWING
DOMINANT, RECESSIVE, HYBRID.

IN EYE-COLOUR, BROWN IS DOMINANT TO BLUE



Pure Brown. (ie Brown + Brown)



Hybrid Brown (ie Brown + Blue)



Pure Blue. (Blue + Blue).

} Eye-colour BROWN.

} Eye-colour BLUE.

which are more favourable to the one type of sperm, and then there is a greater probability of success for that type of sperm. It is possible that, in the future, we may be able in some way to render conditions more favourable to the one type of sperm or to the other, so as to modify the chances of the child's being either male or female.

For the present, we can go no further than to say that the sex of the offspring is determined at the moment of the fusion of the sperm and the ovum ; and that it depends upon whether the particular sperm happens to be a twenty-four chromosome sperm or a twenty-three chromosome sperm.

CHILDREN AND HEREDITY

Eugenics.—As we have choice in the matter of mating we can exercise at least some control over the inheritance of our children. When marriage is contemplated, we should realise that the mate we choose or accept will contribute 50 per cent. of the inherited characteristics, and *that certain diseases and deformities are hereditary*. It is a matter for your conscience whether you are justified in risking the transmission of tainted germ plasm to your children and the generations that will come after them. A great deal of the crime and human misery in this world is caused by people who ought never to have been born. It has been said that men pay far more attention to heredity in the breeding of their horses and dogs than of their children. They know that to get good results in the next generation they must breed from good stocks. The science of healthy race cultivation is known as eugenics (from the Greek "eugenes," meaning well-born). By selective mating eugenicists believe it to be possible to eliminate these undesirable genes which are known to be transmitted, such as the genes which give rise to certain forms of mental disease, epilepsy (some forms), blindness, deafness, certain diseases of the nerves and muscles, hæmophilia (bleeders' disease), and such deformities as hare-lip, cleft palate, club foot, extra fingers and toes, etc. At present there is no law to prevent the mating of, for

instance, deaf-mutes or hereditary mental defectives, who thus transmit the genes which carry deaf-mutism or mental deficiency to their offspring, who in turn may transmit the disease to their children, and so on. It is known that mental deficiency in this country is increasing rapidly—unfortunately one grade of mental defective is exceedingly fertile—and that many thousands of mentally deficient people are at large in the community. Indeed, at present, there is no accommodation for them in the institutions (mental hospitals) where proper protection and supervision can be given to them. Incidentally, many of the crimes of violence, such as attacks on women and children, are committed by these unfortunate people who cannot be held morally responsible for their actions.

Children who are born crippled, diseased, or mentally defective are deeply injured children. In many cases, it is clear from the day of their birth that they can never hope to become useful and happy members of society and that they will always be a burden upon the community. Yet these children grow up, mate and reproduce their kind, who will quite possibly suffer from their parents' taints.

Can anything be done to check this tainting of our race—in other words, to prevent or persuade those who are known to carry in their germ plasm some form of mental deficiency or other disease or deformity, *about the hereditary nature of which there is no doubt whatever*, from having children? If this could be achieved, one result would be to check the alarming increase in mental deficiency in this country. We could not hope to stamp out entirely the hereditary diseases, because some of the carriers of the tainted germ plasm are hybrids, *and appear to be normal*. In them, the hereditary taint is recessive and therefore masked, and they may have no knowledge of the particular taint in the family history. Those apparently normal parents who thus unwittingly produce defective offspring are deserving of great sympathy; but those who deliberately risk the transmission of tainted germ plasm to their children are committing a moral crime, whether they themselves carry the taint or whether they marry some one who is known to be a possible

transmitter of hereditary disease. Please note that a recessive gene may be transmitted through several generations of hybrids who will show no trace of it; but if two such hybrids have children, the children (or some of them) may inherit a double dose of the recessive gene, which will no longer be masked by the presence of a dominant. For those unfortunate mental defectives, who cannot be expected to have a sense of parental or race responsibility, or to exercise forethought or self-control, surely we normal members of society—who form public opinion and make laws—are morally responsible. Our moral standards have compelled us to interfere with Nature's law of the survival of the fittest; in Nature, all living things that are unfit soon perish; but civilised man devotes all his resources to save and cherish the cripple and the imbecile. What adjustments can be made in the interest of the race to compensate for our interference with Nature's law? No one would suggest that we should penalise these unfortunate people by allowing Nature's law to operate and extinguish them; but it is surely reasonable that we should do everything possible to prevent them from handing on their afflictions to other generations. In the case of mental defectives there are two ways of preventing reproduction: we can prevent them from mating by segregating the two sexes in mental institutions, and thus depriving them of their personal liberty; or, in cases where the mental defectiveness is not bad enough to prevent them from taking part in home life, the sufferers can be sterilised by operation or by the application of X-rays to the sex glands, so that although they remain capable of leading a normal sex life, they are unable to produce children. This second method of preventing their reproduction allows suitable cases to retain their personal freedom in the community. The first method of segregation is already in use—we expend nearly eight millions a year on mental hospitals—but the accommodation is sufficient for only a small proportion (1 in 12) of those for whom it is needed. The second method is not legal in this country; but in America sterilisation laws have been in force for over twenty years. Those who are concerned at the rapid increase of mental defectives in

this country in the last twenty years are urging that eugenic sterilisation for mental defectives should be legalised here; and this is one of the vital social questions on which you will be expected to form an opinion. You should know, therefore, in addition to the laws of heredity, something about the operation for sterilisation, which aims at blocking the ducts along which the sex cells leave the glands. In the male, it is known as "the office operation," because it can be performed under a local anæsthetic in about five minutes, through a tiny skin incision in the groin, so that it could well be performed in the patient's office without interfering seriously with his day's work. The ducts from the testes are cut and tied at the point where they pass along the groin just under the skin. In the female, the corresponding ducts lie within the body cavity, so that the same incision has to be made as is required for the removal of the appendix, and the operation is therefore more serious. The alternative is to block the ducts by the use of a cautery at the point where they enter the womb—a procedure that can be carried out from the external genital passage, so that no cutting operation is needed.

The effect on the male of thus blocking the ducts from the testes is to prevent the sperms from leaving the testes, and a curious secondary effect is to stimulate the production of the internal secretions—sex hormones—which are liberated into the circulating blood; so that these sterilising operations have a beneficial effect on the general health. It is as though, by stopping the release of sex cells, more energy is available for the production of the revitalising sex hormones. In fact, in the male this operation is being performed, not for sterilisation but for rejuvenating purposes, on men who wish to regain their youthful vigour.

By means of sterilisation, those apparently normal hybrids who carry the gene for mental deficiency as a recessive (as may be deduced from their family history or from their having already produced a mentally defective child) are enabled to lead a normal sex life; since the sterilising operation does not prevent the normal sex act nor interfere with the sensations associated with it.

CHAPTER VIII

REPRODUCTION IN MAN

Now let us consider the accommodation the human body provides for its sex functions. The germ plasma is housed in the respective sex glands, the ovaries and the testes. The sex cells divide, in the way shown in the illustration, to give rise to ova and sperms, which in due course are discharged into the sex ducts.

In the male, the sperms make their way from the body along the ducts, suspended in fluid to which is added the secretion of certain glands which empty into the ducts.

In the female, the ovum must pass through the womb on its way from the body, whence it emerges either as a minute unfertilised egg cell (unnoticed on account of its almost microscopic size), or, after a delay of nine months within the womb, as a zygote which has developed into a baby. In both sexes the reproductive system does not mature until after puberty. I will describe the structures and functions of the sex organs in greater detail.

The male sex organs

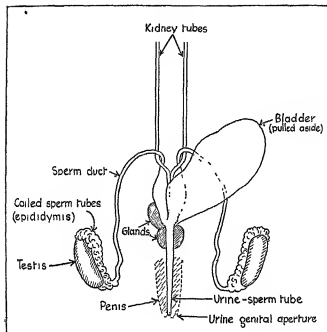
The reproductive organs in the male consist of the two sex glands (testes) in which the sperms are produced ; the tubes along which these sperms leave the testes ; certain glands which contribute a fluid secretion ; and the penis.

The *testes* consist of a mass of coiled tubes with a fibrous covering, and they rest side by side in a pouch of skin (scrotum) outside the body, where the inner parts of the thighs join the trunk.

There are about two thousand coils of these tiny tubes, and it is from certain cells in the walls of these tubes—the original germ cells—that the sperm cells develop. Sperm production continues from puberty for the remainder of life. The testes also produce a “hormone”

or internal secretion which—among other functions—causes the masculine characteristics that develop at puberty.

The sperm tubes do not go direct from the testes to



MALE REPRODUCTIVE ORGANS OF RABBIT.

The sperms develop in the testes and pass along the coiled sperm tubes into the main sperm duct which joins the urine tube at the base of the bladder. The sperm fluid (sperms and secretions from various glands) pass out along the common urine-sperm tube. During copulation, the male rabbit inserts the penis into the urine-genital aperture of the female, and fertilisation takes place internally.

their termination, over twenty feet of fine sperm tube is coiled in a mass within the scrotum, and from the scrotum it takes a fairly straight course until it joins the bladder tube which runs to the end of the penis. Towards the

latter part of its course, it communicates with a storage sac for sperms, which contributes a fluid secretion, and also with a gland at the base of the bladder (prostate

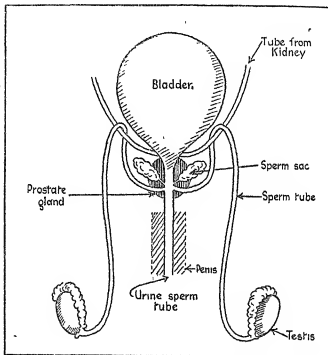


DIAGRAM OF MALE REPRODUCTIVE ORGANS

The male gametes (sperms) develop in the testes and pass along the coiled tubes to the main sperm tube, which joins the urine tube at the base of the bladder. The sperm fluid (semen) consists of sperms (which may have been stored in the sperm sacs) together with secretions from the sperm sacs and from the prostate gland. During copulation, about two hundred million sperms may be released, only one of which is required to fertilise the ovum. The sperms make their way towards the womb and some may succeed in reaching the egg tubes in which it is believed that they can remain alive for about a week.

gland) which contributes more fluid. The sperm fluid (semen) thus contains mature sperms (many millions

may be present in a teaspoonful of semen), and secretions from various glands. It is a curious economy of Nature that, in the male, the bladder tube should serve both for the excretion of urine and also as a channel for the sperm fluid.

The bladder end of the urine tube is closed by a strong circular muscle, so that urine does not trickle away continuously, but is released at definite times by an act of will; the urine and the sperm fluid do not mix. The joint urine-sperm tube projects from the body to form, with its tissues and wrappings, an organ called the *penis*; and by means of this organ the sperm fluid (semen) is able to be placed safely within the body of the female. The skin which covers the penis projects in a loose fold or hood, called the foreskin. If this skin is too tight or too long, or if the orifice is too small to allow the bladder to be emptied without strain, part of it is removed by the operation called circumcision (meaning "circular cut").

All Jewish boy babies are circumcised soon after birth; and at this age the operation is very simple and probably almost painless. The operation may be necessary to prevent difficulty in emptying the bladder and consequent danger of rupture from straining, or to prevent irritation caused by pent-up secretions.

The penis consists of more than the urine-semen tube. There are, of course, the nerves and blood-vessels (arteries carrying blood to the penis and veins carrying it away again), but there are also two bundles of a peculiar spongy tissue, the whole being wrapped in supporting tissue and skin.

The spaces of the spongy tissue are normally empty, so that the penis is quite soft; but at special times they may become distended with blood, causing the penis to swell and stiffen; and this happens when the veins leaving the penis are compressed, so that the blood cannot flow away at the same rate as it enters through the arteries—it is due to the extra amount of blood held within this organ. In small boys the pressure of a distended bladder may cause this temporary swelling of the penis—known as

an erection. It also occurs after puberty during sex excitement.

The female sex organs

The sex organs of the female consist of the two sex glands (ovaries); two egg tubes leading from the ovaries to the womb; the womb which houses the growing baby; and the external tube, the vagina.

The *ovaries* are two small rounded glands which lie one on each side in the lower part of the body. They produce the ova or egg cells: very few—rarely as many as a dozen—ever become fertilised.

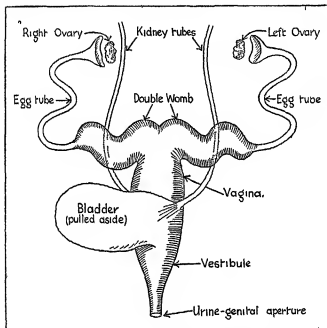
At birth, the ovary contains about 70,000 ova-producing cells. It is calculated that about 400 ripe ova are discharged from the ovaries during the years between puberty and the end of the reproductive life, which occurs at the average age of forty-five. The ovaries also produce a hormone or internal secretion similar to that produced from the male testes, but of course this secretion gives rise by the *female* characteristics that develop in the female at puberty.

The *egg tubes* which convey the ova to the womb are curious, in that the ovarian ends are not continuous with the ovaries, but terminate in open ends surrounded by finger-like processes, which are thought to help to direct the discharged ovum safely into the tube—rather like the tentacles of the hydra helping to waft food into its mouth. Undoubtedly some ova do fail to reach the tube, and simply fall into the body cavity. The inner ends of the tubes are continuous with the womb (see diagram).

← The *womb* (uterus) is indeed a wonderful organ. It is really a specialised part of the egg tubes which here join together and become a single tube—just as the stomach is a specialised part of the food pipe.

In some animals (*e.g.* the rabbit) the tubes here have not united into one, and in these animals we say the womb is paired. The human womb is shaped somewhat like a flattened pear, stalk downwards, and measures about $3\frac{1}{2}$ inches long. It has thick muscle walls, and its cavity is continuous above with the egg tubes, and below,

through a tiny opening in its "neck," with the wide tube (*vagina*) leading to the outside. During the child-bearing age it sheds its lining and grows a new one, about once every twenty-eight days (see *Menstruation*).



FEMALE REPRODUCTIVE SYSTEM OF RABBIT.

The egg tubes swell out to form a double womb in which the young rabbits develop. The eggs from the ovaries drop into the funnel-shaped openings of the egg tubes and pass along to the womb. The sperms which are deposited in the vagina travel along through the womb to the egg tubes to fertilise the eggs.

The womb in a woman who has not had children weighs about 2 ounces, but it is capable of growing enormously, until, in a pregnant woman, it weighs about 2 lbs. and has a cavity large enough to contain a baby weighing 7 to 10 lbs. and also the "afterbirth." It then becomes the most powerful muscle in the body.

The *vagina* is a relatively wide tube, 4 to 5 inches long, connecting the lower end (neck) of the womb with the exterior. The neck of the womb projects into its upper end, and the lower end is partly closed by a thin, skin-like ring of tissue—the hymen or “maiden-head”—which forms a diaphragm perforated near the centre. The bladder tube opens into the lower end of the vagina.

The *hymen* varies in size and thickness: it may be

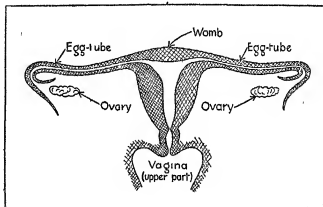


DIAGRAM OF HUMAN FEMALE REPRODUCTIVE ORGANS

The female gametes (eggs or ova) develop in the ovaries. One egg is released each month from alternate ovaries, and takes about a week to travel along the egg tube to the womb. If sperms are present in the egg tube, the ovum may be fertilised and become a zygote which will embed itself in the lining tissue of the womb and develop into a child. It is thought that the ovum remains alive for three or four days in the egg tube; but if no sperms reach it, it dies and is presently washed away from the womb.

abnormally thick and fleshy, or it may be almost non-existent. It may be ruptured by strenuous physical efforts or, of course, during a medical examination of the womb. During the first complete sex act the hymen is stretched and usually splits in one or two places.

PUBERTY AND ADOLESCENCE

Puberty is the time when the sex organs are reaching maturity—when the production of ripe ova and sperms from the sex glands begins. It marks the end of childhood, and the subsequent period of transition to manhood or womanhood is known as adolescence. #

Puberty in girls begins at about the age of fourteen, and in boys a little later, at about the age of sixteen; but in both sexes it may occur two or three years earlier or later than usual. In both sexes rapid growth is taking place at this period, and mental and physical changes—the secondary sex characteristics—develop that change the girl into a woman and the boy into a man. The powerful sex hormones or “chemical messengers” of the sex glands, and an increased amount of the secretions of other glands, are circulating in the blood, affecting the whole body and mind, and it takes some time for harmony to be restored.

Puberty and adolescence, then, are times of great physical and mental strain. It is not uncommon for periods of restless activity to alternate with times when the slightest effort, mental or physical, is irksome; and grown-ups who lack understanding are apt to become irritated with these spells of what appear to them to be sheer laziness—when the young people sit about crouching over story books or just day-dreaming.

This apparent laziness is, of course, due to the fatigue of mind and body when a great deal of energy is being used up in growth and in adjustment to the physiological and psychological changes that are taking place.

It is during adolescence that the sympathetic understanding of parents, teachers, and older friends can be of the greatest value. If you yourself are passing through this difficult stage, if you are perplexed by the unaccountable moods and emotions that overwhelm you at times, don't think that it is the world that is wrong; it is just the same old world that you knew in the happiest moments of your childhood. It is you yourself who are developing.

There is probably just as much happiness ahead of you when your body and mind has made its great adjustments and settled down to harmony again.

Don't be afraid of talking freely with your parents. Really understanding parents won't force your confidence—but they will meet you more than half-way if you show that you need their sympathy and help. The older generation often understand far more than you suspect, and they are only too anxious to help you; but they, too, suffer from a certain shyness and reserve, and you must do your part in breaking this down by offering your confidences.

If, unhappily, your parents fail you, there may be older relatives or friends, or the family doctor or clergyman, who will step into the breach; or you may have to resort to books. Here let me warn you that some people and some books, even when they have every intention of being helpful, may be worse than useless to you.

The secondary sex characteristics—those physical and mental changes due chiefly to the secretions of the sex and other glands—I will describe separately for each sex. The following remarks apply to both sexes.

Health care during adolescence

During this transitional period, when you are no longer a child nor yet a man (or woman), you are building the foundations for adult life, and your present mode of life will have an important effect on your health of mind and body for the rest of your life.

You may build up a strong body and a well-balanced mind: you may fritter away your possibilities and so heavily load the dice against yourself that you will never get a "square deal" in the great game of life. It is impossible to separate bodily and mental health completely, for the influence of mind on body and of body on mind is very great indeed. At all times, but especially during adolescence, you must observe the rules of health if you wish your body to grow up strong and beautiful, and your mind

to be vigorous and alert. To both sexes, then, I give this advice :

1. *Avoid over-fatigue, or any prolonged physical or mental strain*

*The body has particular need of rest at this time, and the strain of over-study—cramming for an examination or preparing for a career—or of immoderate physical efforts in competitive games or exhausting exercise in any form, may be disastrous.

A "nervous breakdown" during adolescence is by no means uncommon, and it is usually due to ignorance of, or indifference to, the special needs of the body at this critical time of stress and strain. Many of the mental and physical troubles of adolescence are due to prolonged over-fatigue and to lack of sleep. Headaches, eyestrain, rounded shoulders, deformity of the spine, flat feet, and general bad posture may all be due to insufficient sleep and rest.

A long night's rest—at least ten hours in bed—should be the rule, and a rest of half an hour after meals is most desirable; but five minutes' lying down limp and relaxed is much better than none at all! This is not waste of time, but a real saving in the long run, since you work quicker and better if you are not fatigued.

2. *Have regular meals of plain, nourishing food*

The boy or girl at puberty needs as much food as, if not more than, an adult; and there is special need for such valuable foods as milk, meat, fish, eggs, cheese, lentils, butter, fruit, salads, vegetables, and wholemeal bread and cereals. At least a pint of milk should be the daily ration, and the habit of water-drinking between meals should be cultivated.

Don't upset the natural rhythm of your digestion by nibbling sweets, chocolates, or biscuits between meals. Some young people think nothing of consuming half a pound of chocolates while sitting through a cinema

show: it is just a bad habit. Remember, you cannot build up a strong and healthy body without a healthy digestion; and your digestion will not remain healthy if you irritate your stomach with cocktails, spirits, rich or highly spiced foods and excess of condiments, or by irregular meals.

3. *Do not neglect fresh air, sunshine, and exercise*

Fresh air and exercise you must have at all times for health, but it is particularly important during this critical time of growth and development. Young people who spend most of their time indoors, poring over books, and do not organise their lives so as to find opportunity for outdoor exercise, are asking for trouble. They generally become listless and anæmic, their skins become sallow and spotty, and they are troubled with constipation and headaches. They usually hold themselves badly, and develop an ugly slouch, rounded shoulders, and an ungainly walk.

That it is quite possible to study hard for a career and at the same time to keep fit is proved by the numbers of young people who succeed in doing so; but you will find that these people have the wisdom to plan their daily programme so as to allow for outdoor exercise, and to take full advantage of the great health benefits of fresh air and sunshine. A brisk walk part of the way to school, college, or to work, a few minutes' skipping or physical exercise before breakfast, and taking part in games and sport—these are some of the ways in which the needs of the body for fresh air and exercise can be served. Once again let me emphasise the need for moderation—the happy medium should be the aim. Outdoor exercise in moderation is a real economy of time in the long run; your brain will work more quickly and effectively, your digestion will be better, your sleep will be deeper and more restful, and your whole body will benefit from the increased circulation of blood from and the more active functioning of the skin which is one of the rewards of open-air exercise. For advice on the choice of the different forms of exercise, read the chapter on Exercise for Health and Pleasure.

The sex impulse

The interest in sex matters during adolescence varies a great deal in different individuals. There are some who go through adolescence untroubled by sex; others find that they are conscious of the awakening of definite sex feelings, and may be shy or excited in the presence of the opposite sex. In some the sex urge is definite and strong, and may be profoundly distressing and a source of danger. The conscious interest in sex, then, varies from zero to 100 per cent.

The attitude to sex matters and reproduction will already have been settled by early sex education or its absence. If instruction in sex matters has been neglected or wrongly given, the result may be that you regard sex as something unclean or at least unwholesome—as something to be discussed furtively and with crude humour, a subject for vulgar jokes. If you have had no instruction in biology, the fascinating story of the evolution of life revealed by a study of plants and animals and by progressive stages to man himself, the facts of human reproduction may come as a real shock, and may even affect your attitude to your parents. You will then be unable to get a proper sense of proportion; your mind will concentrate upon and distort the physical details of the sex relationship and you may well fail to appreciate the greater significance of the emotional and spiritual attributes of sex in man. Even the admonition of a great divine—that “We should not be ashamed to speak of what God was not ashamed to create”—may fail to move you. Such a distorted attitude to sex is a great pity; it is the effect of ignorance of the true meaning and power of sex in life; and the practical result may be disastrous. I met one attractive young woman who longed for a home and children of her own, and who had become engaged to be married three times; but each time she found that she could not face the sex relationship in marriage, and so broke off the engagement. She had had no sex education whatever, except for picking up a few crude and distorted facts about the origin of babies and the part of the father in fertilisation, from companions at school

who treated the whole matter as a source of crude humour.

Puberty and adolescence in girls

The onset of puberty in girls is marked by the appearance of the monthly menstrual flow from the womb, a gradual development of the breasts which begin to take on the typical fullness of womanhood, and the growth of hair under the arms and on the genital region. No less striking than these physical changes are the mental developments, as the irresponsibilities of childhood give way to the more serious attitude to life of the adolescent. The sex hormone or internal secretion of the ovaries now begins to circulate in the blood, and other glands become more active, giving rise to the physical changes outlined above, and to profound mental and emotional upheavals during this time of "storm and stress." The young girl may become emotional, irritable, shy, and awkward; she may suffer from moods for no apparent cause, and the family may complain that she has become very "difficult." Growth is rapid during the early years of adolescence, and the consequent great expenditure of energy leads to periods of fatigue on account of which she is often unjustly scolded for laziness.

Menstruation

One remarkable function of the womb is that, every month during the child-bearing period of life, it casts off its lining tissues and repairs itself by growing a new lining. When this occurs for the first time, at the age of from twelve to fourteen, it naturally causes alarm and distress if the girl does not understand what is happening—for, of course, it is accompanied by some loss of blood, which, together with the cast-off cells, constitutes the menstrual discharge, or "flow," as it is sometimes called. The bleeding is not profuse—there is just an oozing of the discharge, lasting on an average about four days, and during this time the girl must wear a sanitary pad to protect her clothing. In health, there is no pain associated with menstruation, and apart from the inconvenience of having

to wear the sanitary pads and the cleansing involved, there should be no interference with normal routine. At this time, however, special precautions should be taken against chill and against exhaustion; so that it is not wise to take part in very strenuous games where the last ounce of effort is called for. The daily bath should be taken as usual, and it is quite untrue that there is any danger from bathing or from washing the hair during menstruation, if reasonable precautions against chill are taken. If you are accustomed to a daily cold tub, there is no reason to discontinue during the menstrual period. It is important that scrupulous cleanliness should be observed; the pads should be changed several times during the day, according to the amount of the flow; and before putting on the fresh pads the parts should be washed in soap and water and dusted with talcum powder. A soiled pad becomes offensive because putrefactive changes take place in the discharge.

What is the meaning of the onset of menstruation? It is one of the signs of wonderful changes which are taking place in the body, changes that are transforming the girl into a woman. Menstruation is a sign that the eggs in the ovary have begun to ripen, and that each month—about twelve days after the beginning of a menstrual period—one egg will be discharged into the egg tube and make its way to the womb, which has by then prepared for it by growing a new lining. The vast majority of the eggs that will be received into the womb during the reproductive life of the woman simply pass out from the womb into the vagina and hence from the body; and if you remember that the human egg is barely visible to the naked eye, you will not be surprised that its loss takes place quite unnoticed. When menstruation is first established in the young girl, her reproductive organs are only beginning to mature; and although motherhood is then just possible it would be most unwise. Among Indians and other races where girls develop much earlier than in the white races, quite young girls marry and produce babies; but there is a high death rate among the mothers and babies. It is very much better that marriage should be delayed until the repro-

ductive system is properly mature and the body is no longer using up energy for growth and development.

Menstruation, then, is an indication of the great changes taking place in the reproductive organs and of the production of the powerful sex hormone or internal secretion of the ovary. A definite rhythm is being established, a rhythm which, through the ovarian and other hormones, affects the whole of the body. It is not surprising, then, that it may take some little time before it runs quite smoothly—the body's orchestra may need considerable practice before harmony is achieved. Thus it may be some months before menstruation becomes quite normal; the first few periods may be rather profuse, and may occur at irregular intervals; but if within a year menstruation has not become quite regular and normal, it is wise to consult a doctor in case any special treatment is advisable to assist the body in making this great adjustment. A doctor should be consulted if the periods are painful or cause a marked derangement of the general health.

The sex impulse in girls

The sex impulse may be aroused by the mental effect of erotic books, films, and plays; or by the physical stimulus of kissing and other contact with the opposite sex in flirtation; or by deliberate handling of the genital region (masturbation); and certain normal results are produced. There is an increased blood supply to the genital organs—including the womb—and this leads to a feeling of tension and awareness of this part of the body; and a pouring out of secretion from certain glands in the genital canal, causing a sensation of moistness and possibly the excretion from the vagina of a clear, thin fluid. The feeling of tension may gradually subside when the stimulus is removed, or it may culminate in an emotional climax, a moment of intense sex feeling known as an orgasm, after which there is a more rapid return to normal. Many quite normal girls never experience this intensity of sex feeling until normal sexual intercourse takes place after marriage. Others who are more strongly sexed, or who unwisely stimulate the sex urge in one of the ways I have mentioned,

are tormented by sex desire and may attempt satisfaction by resuming the infantile habit of masturbation (known popularly as "self-abuse") at the cost of much mental conflict and expenditure of energy. A wiser solution of their difficulties I shall suggest in the section on SUBLIMATION OF SEX.

Puberty and adolescence in boys

The onset of puberty in boys is marked by mental and physical changes comparable to those found in girls, but, of course, taking different form. There is no process in the male analogous to menstruation, since the fertilised egg develops within the womb of the mother, and there is no need, therefore, for an organ to house the growing baby in the father; his part in reproduction is limited to the production of the sperm cells for the fertilisation of the egg cell. There are no such breast changes as take place in the girl, since in the male the breasts or mammary glands are rudimentary: the business of suckling the infant is undertaken by the mother. There is, however, the same rapid growth and the appearance of hair in the armpits and in the genital region, as well as the appearance of hair on the face (beard and moustache); and there are physical changes in the shape of the vocal cords and adjacent structures in the neck that lead to a deepening of the voice; the childish treble is gradually changed to the deeper adult male voice; and the boy's soprano singing voice "breaks" and becomes either a tenor, baritone, or a bass. From this time onwards there is an occasional discharge of seminal fluid from the storage sacs in which it has accumulated; and as these discharges normally occur during sleep, they are called nocturnal emissions ("wet dreams"). Now, just as the girl approaching puberty should be prepared for the natural appearance of menstruation, so should the boy be prepared for these periodic discharges of seminal fluid; otherwise a sensitive, nervous boy is apt to be worried and alarmed by these emissions. He should realise that they are quite natural and can be disregarded unless they become too frequent; they may then give rise to abnormal fatigue and lassitude,

in which case a doctor should be consulted. Erections are a frequent occurrence about this time, and they also may be disregarded.

The sex hormone or chemical messenger produced by the testes now begins to be poured into the bloodstream, and other glands of internal secretion (the thyroid and pituitary) produce increased quantities of their hormones; and these secretions are responsible for the secondary sex characteristics (growth of hair, change in voice, etc.) of the youth, as well as for the mental and emotional changes that we associate with manhood or maleness. The boy at this stage often becomes shy and reserved, and moods of boastfulness and aggression may alternate with moods of diffidence. Like the girl at this period, he is often found "difficult" in his home and school and business relations; and his rapid mental and physical growth leads to periods of fatigue and lassitude.

The sex impulse in boys

The sex impulse in the male may be aroused by mental stimulus of erotic books, films and plays, or "day-dreams" of a sexual nature, or by the stimulus of injudicious flirtation with the physical contact of kissing and other forms of caress, or by masturbation. The physical changes which occur at such times are due to the increased blood supply to the genital organs and to the activity of various sex glands. Owing to the peculiar structure of the penis with its erectile tissue consisting of masses of blood spaces, the increased blood supply causes the organ to swell and stiffen, and this condition of the penis is called an erection. The erection ordinarily subsides gradually, but it may culminate in a discharge of seminal fluid—an emission of the sex cells (sperms) in their protective fluid. Whether or not an emission occurs, there is always a pouring out of a clear, rather viscous fluid from the accessory sex glands; and this preliminary secretion may contain a few active sperm cells which are capable of fertilising an ovum. Nature has arranged for the periodic emptying of the pent-up seminal fluid from the storage sacs by the nocturnal emissions to which I have already

referred ; so that sexual intercourse with the opposite sex is *not* necessary for this purpose. As in the case of girls, the sex urge varies tremendously in boys. It may be unwisely stimulated, and masturbation may be resorted to as a means of relief of tension, at a cost of physical and mental efficiency if it gives rise to mental conflict, or is excessive. The sex impulse represents a vast amount of energy—creative energy—that can be released in more suitable channels than through physical expression of sex, whether normal or abnormal.

THE EVOLUTION OF SEX

Before I proceed to the particular consideration of the fertilisation and development of the human ovum, I want to outline briefly the stages of the development of sex, to emphasise that in the highest forms of life it is concerned not only with reproduction, but also with those higher moral and emotional and creative qualities that distinguish man from the brutes.

In the evolutionary progress of sex we see the development of a physical sex attraction, progressing to include an æsthetic attraction, and finally—the highest level of all—an emotional sympathy and co-operation.

In the lowest levels of life sex appears to be a purely physical function concerned with reproduction, in which the parts played by the parents are limited to the production and liberation of the reproductive cells. For instance, the mature ova and sperms of many simple aquatic creatures are expelled from the parent bodies into the water and left to their fate; this automatic shedding of the gametes takes place quite independently of the proximity of the opposite sex.

The act of spawning of certain female fishes stimulates the males to shed their sperm fluid on to the eggs ; and although there is here an awareness of the opposite sex, there is yet no contact between the parents.

At a further level, we find a preliminary caressing, or "courtship," with physical contact but with fertilisation still external. The male frog's embrace of the female and

the caressings of certain fishes are examples of this stage.

At a still higher level æsthetic attraction is associated with reproduction—appeals to the sense of smell or sight or hearing—when usually the male displays his charms to excite the sympathetic interest of the female. The male peacock displays his gorgeous plumage, the male pigeon struts and coos, the blackbird sings his song. In some species there is prolonged courtship before actual mating, as when the bower-bird builds his beautifully decorated bower. Then we find co-operation between a pair, sometimes before actual mating has taken place, to protect their lair or nest from intruders. When the care of the young is undertaken by both parents we find the sexual relationship assuming a much wider significance. In many birds and animals there is devoted co-operation in the rearing of the offspring.

Sex reaches its highest level in monogamy, when the two partners mate with one another for life. A common example of this is the swan; ravens and certain monkeys, too, are believed to mate for life. Many animals practice seasonal monogamy, or mating for the breeding season.

It is in humans that sex reaches the highest level of all; in a normal happy marriage the physical sex act in its emotional, æsthetic setting takes its place as the physical expression of the sex urge inherited from pre-human ancestors, but it is associated with love for and faithfulness to the mate, and sympathetic, unselfish co-operation in the care and protection of the family.

The sex act in man

As in all other sexually produced forms of life, fertilisation of the human ovum results from the fusion of male and female gametes; and this is made possible in man by the sex act or copulation. Just as the pollen of a flower is carried to the ovary of another flower, so must the male fluid containing the sperms be deposited where they can make their way towards the human ovary. The precise details of the sex act in humans do not concern you until you are about to be married, and for various reasons it is

wise to postpone seeking such detailed information until that time arrives. When you are about to be married you should consult your parents or your family doctor or other competent adviser, or read some suitable book written for those about to be married.

The physical act as a climax, when after a long period gradually increasing interest, respect, and affection have ripened fully into love, is a thing utterly different from the same act in any other circumstances; nor is it possible to experience what you should experience, unless you are in that delightful state—being in love. It is not, however, this inability to appreciate properly the emotional side that is the greatest argument against taking a premature interest in the physical details of the sex act: it is rather the fact that if you do take this premature interest in the *physical*, you may rob yourself of your chance to experience fully the *emotional* in the future; you may bring upon yourself an entirely wrong attitude to sex—a gross and coarse attitude, or even an attitude of unnatural disgust: and this you may never be able completely to eradicate. You will lose one of the finest and most ennobling experiences that life can offer. You will be like the unfortunate man who could not appreciate a beautiful sunset because the redness of the sky reminded him so much of a lump of raw meat! I do urge you, then, to wait for the final revelation of the intimate details of the human sex act until you can see it in a proper perspective; that is, until you are about to marry the mate you love.

PARENTHOOD

Conception is the fertilisation of the ovum. Not every act of copulation—or coitus, as it is also called—results in conception; for normally only once a month is an ovum released from the ovary, and this ovum remains alive and capable of being fertilised by the sperm for a short period, almost certainly less than a week. If, during this period when the ovum is making its way along the egg tube to the womb, it meets and fuses with a sperm, the fertilised egg or zygote immediately begins to develop

into a human embryo or immature human being. We have at present no means of knowing exactly when the release of the ovum from the ovary (ovulation) will occur in any individual case ; and also there is a possibility of irregular ovulation. We cannot, therefore, know for certain that any particular sex act will or will not cause conception. We have reason to believe, however, that ovulation takes place usually from the tenth to the fifteenth day after the first day of a menstrual period.

The father's part in conception is to supply the sperm fluid. About a teaspoonful of this fluid (semen), containing several millions of sperms, is deposited into the female vagina, near the mouth of the womb. The sperms, by lashing their tails, swim along the moist lining of the vagina towards the womb ; there is probably some chemical attraction which guides them in the right direction. Those which succeed in passing through the tiny opening into the womb then continue their journey through the womb and into the egg tubes, where normally the meeting between ovum and sperm takes place. It is known that the sperms can live within the female genital passages for several hours, possibly for days if the conditions are favourable ; so that fertilisation of the ovum may take place some time after the particular sex act which contributed the sperms.

When a sperm approaches an ovum, the ovum projects a cone of its protoplasm towards it, and the sperm then bores its way into the ovum through this protoplasmic bulge ; the tail of the sperm, which has now served its purpose, does not enter the ovum, but is discarded. The fertilised ovum, which has thus become a zygote, develops a protective outer zone which prevents other sperms from entering. The sperm which has succeeded in penetrating the ovum then swells out into a typical reproductive nucleus, carrying its set of chromosomes from the father stock ; and it unites with the nucleus of the ovum which carries the set of chromosomes from the mother stock. Thus the zygote has now the full complement of chromosomes, half from the mother and half from the father.

Development of the zygote within the egg tube

The journey of the zygote along the egg tube to the womb may take two or three days, and during this time development is taking place rapidly, so that by the time the zygote reaches the womb the one cell has, by repeated simple cell division, become a mass of several hundreds of cells, and these cells have already begun to arrange themselves into a definite pattern to form a human embryo.

Attachment of embryo to womb

You will perhaps remember that the human ovum is only just visible to the naked eye; it cannot therefore carry a large amount of yolk as food for the growing embryo. The embryo must arrange to get its nourishment from the mother's blood, and it does this by establishing a communication between its own blood-vessels and the mother's blood in the wall of the womb. It embeds itself—a process known as nidation or "nesting"—in the wall of the womb, and it sends out blood-vessels along the cord which attaches it to the womb. That specialised part of the womb, in which there is free communication between the mother's blood and that of the embryo, is known as the placenta, and here takes place the exchange of food and oxygen from the mother and carbon dioxide and other waste products from the developing baby. Except for the short period when the zygote is consuming the small quantity of yolk contributed by the ovum, the developing child obtains all the material for growth and for its vital processes from the mother's blood. If the mother is not properly nourished, she cannot supply all that is needed by the growing child, and you will appreciate how important it is that the diet of the mother-to-be should be satisfactory. Moreover, as the mother has to excrete the waste products of the child in addition to her own, her excretory organs—kidneys, liver, lungs, and skin—must be kept healthy and must not be overworked through over-eating or through eating excess of meat and other protein foods.

The birth of a child

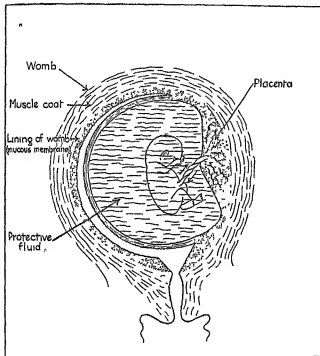
Although by the end of the fifth week after conception the essential systems of the human body are represented in a primitive stage, the child will not be ready to be born until the end of the fortieth week. During most of this period of ten lunar months, the embryo floats in a sac of protective fluid, and the womb steadily enlarges to keep pace with the increasing size of the baby. When he is ready to be born, labour begins; the strong, muscular womb establishes regular contractions in order to squeeze out its contents. First the neck of the womb is gradually stretched until it is large enough for the baby to pass through; then, assisted by the body muscles, the womb gradually pushes the child along the birth canal until finally it passes out through the mother's vagina and is born into the world. Just as in the case of puppies and kittens, the human baby when born is still attached to the mother's womb by the cord along which it has received its nourishment from the mother. This cord is cut across and the ends tied to prevent bleeding; the short stump of cord still attached to the baby shrivels and drops off within a few days of birth; the scar which remains to mark the site of the attachment is the navel.

After the birth of the baby, the womb continues to contract until it has succeeded in pushing out the "after-birth," which consists of cord, placenta, and the membranes which lined the womb and in which the fluid was enclosed. This expulsion of the afterbirth marks the end of the labour.

Stages of development from conception to birth

You may like to know something of the various stages of the development of the child within the mother's womb. At the end of the fifth week the embryo is only about one-fifth of an inch long, yet it already possesses a primitive beating heart, a digestive tube, a nervous system, and the beginnings of eyes and limbs; and there are traces of our evolutionary history in the presence of gill clefts (representing the gills of a fish) and a distinct tail, both of which disappear in due course. By the end of the eighth week

the embryo is an inch long, and the fingers and toes are forming. At the end of the twelfth week the nails are present on fingers and toes and it is now possible to dis-



CONTENTS OF WOMB AT THE END OF TWELVE WEEKS' PREGNANCY.

The developing child, which now measures 2½ inches in length, is floating in a sac of fluid. It has established communication with the mother's blood at the specialised part of the womb lining, the placenta, to which it sends blood-vessels along the umbilical cord. The blood flowing from the child to the placenta carries waste products to be excreted by the mother. The blood flowing from the placenta to the child carries food and oxygen extracted from the mother's blood.

tinguish the sex; the embryo at this stage is about three inches long and weighs about a quarter of a pound. In

another month its length has increased to six inches and the weight to a pound; the muscles are growing bigger and the skin is now a warm pink colour. During the next month, the fifth, "quickenings" occurs—that is, the mother feels for the first time the movements of her child; these movements are at first very faint indeed—just a gentle flick—but they gradually increase in strength as baby becomes more vigorous. By the end of the sixth lunar month he is over a foot long and weighs about two pounds. At this stage eyebrows and eyelashes begin to appear and colour forms in the fine hair on the head; the skin of his body is covered with fine downy hairs, which will have disappeared by the time he is ready to be born. In a further four weeks, that is, by the end of the seventh lunar month, he has become "viable," which means that he will be capable of living should he be born prematurely at this stage, although he would be only about fourteen inches long and just over three pounds in weight. His chance of survival at this stage, however, is not too good. In another four weeks, when he is sixteen inches long and weighs just over four pounds, he has a good chance of survival if he is born prematurely, although he is then eight weeks short of full term. We should know that he is premature and not just an abnormally small full-term baby by his toe-nails, which would not have grown to the end of his toes; his skin would be very wrinkled, too, so that he would look rather like a tiny wise old man. At the end of the fortieth week or tenth lunar month, which is known as "full term," when baby is fully equipped to take on an independent existence, he is, if of average size and weight, twenty inches in length and weighs about seven pounds. Babies are born weighing less than three pounds at full term, and at the other extreme are those which weigh twelve pounds or more.

Physical changes at birth

At the moment of birth baby will for the first time begin to use his lungs, as he can no longer get his supply of oxygen from the mother's blood—the circulation of his blood along the cord to the placenta ceases very soon

after birth, even if the cord is not severed. His digestive organs now begin to function, so that he can extract nourishment from his mother's breast milk instead of receiving his food already digested from her blood; and his excretory organs must begin to take over the job of getting rid of his waste products. Certain important changes take place in his heart and circulation, for he no longer needs to send his blood along the cord to the placenta. You will see, therefore, that at birth very vital changes take place in the body of a baby.

DUTIES AND RESPONSIBILITIES OF HUMAN PARENTS

When the hen's eggs hatch the newborn chicks are able to walk about within less than an hour of birth. The foal is able to trot along by his mother's side within a few hours of being born. The human baby, however, is singularly helpless for the first year or two of his life. He needs the constant care of his mother during his early years, for he is the most helpless of all the higher animals. The proper care of children calls for the unselfish co-operation of the parents for many years, not only for the provision of their physical needs for food, clothing, protection from dangers, and so on, but also to provide that happy home environment with an atmosphere of security, affection, and harmony that is essential for the normal development of the child. Each parent must play his or her part, for psychologists have shown that the influence of both mother and father is essential for the best development of the child. Thus parents undertake a very grave responsibility when they have children, and their influence on their children persists not only during their early years, but for the whole of their lives. At the moment of conception the child receives its hereditary endowment from both parents; during the forty weeks when it is developing within the womb it is dependent upon the mother for nourishment and protection; and from birth onwards both parents provide a most important part of that early environment which leaves its mark for the rest of life.

CHAPTER IX

ADJUSTMENT TO SOCIETY

ON BEING A GOOD MIXER

You have probably read the story of "The Monkey's Paw," which conferred upon its possessor the right to have three wishes granted. I wonder what *your* three wishes would be if the magic token came into your hands. If I were wishing for you, I should put good health of body and mind first. My next choice for you would be a strong character. I have no doubt about these first two. The third and last wish would need careful thought. What should it be? Beauty? Success? A long life? None of these, I think. Equipped with health of body and mind and with a strong character, you should be able to achieve all these without magical aid. The object of the last wish must be happiness; and if this were too wide and too vague to be the subject of the wish, I should ask that you might be "a good mixer."

A good mixer is one who gets along well with people. Much of what really counts in life consists of our relationships with other humans. If we so manage—by luck or by judgment—that these relationships are smooth, satisfying, and warm, we shall almost certainly have a reasonably pleasant journey through life. If we mismanage them, we shall not enjoy life as we might.

There is no doubt that many people are natural good mixers, and in their cases, the gift—or whatever you may call it—is probably the total effect of the different qualities that go to make up their characters. They inspire warmth towards themselves because they are at heart thoroughly decent fellows. There are, however, many equally estimable people who somehow "miss the boat." This brings us to the point: Can the gift be cultivated? I think that it can, unless there are fundamental flaws of

character which cannot be eradicated; and the gift is certainly worth cultivating, if only because of its influence on your general happiness. But it is also "good business" and may help you along the path to material success.

If you consider the good mixers whom you know, you will find that they have certain traits and qualities in common, and you may conclude that their gift consists in the possession of these traits and qualities.

A sense of humour.—A sense of humour is essential if you are to get along in the world with any degree of comfort; but the question arises: What is a sense of humour? A man may be extremely witty and amusing without having exactly this quality. A sense of humour is necessarily somewhat *kindly*—an ability to laugh *with* others rather than *at* them. It includes a readiness to laugh at oneself, and it is here many people fail lamentably. An overwhelming sense of one's own importance, or an inferiority complex that makes one unduly touchy, may account for the trouble; or it may lie in a lack of a sense of proportion—it is a good thing sometimes to be able to see oneself not as the centre of the universe, but as a small atom in it. None of those handicaps should prove too difficult to overcome, if you take yourself firmly in hand; but if you lack the essential kindness, you will probably fail—but then you do not deserve to be able to get along with your fellows.

Tact.—Tact is the oil of the social machinery. It springs from a regard for the feelings of others, and consists in avoiding treading on people's corns *unintentionally*.

Good intentions alone will not always save you from minor errors—we all know some good-hearted, blundering soul who is always putting his foot in it. A certain numble-wittedness is demanded at times: the need for the exercise of tact may arise quite suddenly, and silence and a masterly inactivity may not meet the situation.

You are apt to blunder at times because you have let your mind wander from the company: you may be thinking too much of yourself, or you may be just day-dreaming. In either case you can claim no sympathy: it is at least discourteous not to give your attention to your

company. You are not free—as you are when you are alone—to think exclusively of your own affairs, or to drift off into wool-gathering.

Thinking aloud leads to trouble at times. Think before you speak is as sound a rule as “Look before you leap.”

It is not wise to say anything which may hurt or offend others, unless you know that there is no one present who will in fact be hurt or offended; and the more strongly you express yourself, the worse is the risk you take.

Tactlessness, then, commonly implies a lack of interest in or consideration for your company, or else some degree of slow-wittedness.

It is impossible to go through life without an occasional breach of tact; but if you make it a rule never to make spiteful or cutting remarks, you will not commit any unpardonable errors. Good intentions and kindness will deprive your errors of all or most of their sting, and will usually leave it possible to “cover up” gracefully.

Sympathy.—Sympathy is not to be taken to mean a willingness to moan in tune with the moans of the habitual grizzler, whom no one should encourage or even tolerate; nor need it imply too much patience with the bore. It means rather what its derivation suggests—a feeling *with*. You must be able to enter into other people’s feelings, to understand them, to rejoice with them in their good fortune, and feel for them in their troubles; you must be able to be *with* them in spirit. You must be “tuned in” to other humans.

You cannot do all this if you are coldly selfish, or even if you are too self-centred. To yourself, of course, you are the centre of the universe; but only to yourself. When you are in contact with others, you just keep this self of yours somewhat in the background.

I doubt whether a really cold and selfish nature can be mended except by long and deep misfortune; but lesser degrees of selfishness or self-centredness do yield. Quite often people who have never had a thought beyond their own pleasures, mellow wonderfully when some accident—or even some whim—throws them into positions where they become responsible for the happiness or welfare

of others. The selfishness gives way to kindlier and more altruistic impulses, and the whole character improves. If you stand in need of a "cure," then, take up—deliberately and for the good of your own soul—some task which will make demands upon the better side of your nature, which may never hitherto have been given a real chance to develop itself.

Poise.—It is a sad fact that many people, who have all the solid and substantial qualities that should enable them to mix well, fail because they lack poise, and suffer from embarrassment in the presence of all except close acquaintances. They find it difficult to make friends, and are awkward and ill at ease when they meet people for the first few times. The condition feeds upon itself, until at last the sufferer throws up the sponge in despair and retires within himself, avoiding meeting people whenever possible, and suffering tortures when circumstances will not permit him to avoid meetings.

The trouble must be tackled and overcome, and the sooner it is done the better. Every failure to face up to things makes the position more difficult. If you continue to give way, you lose a tremendous amount of the pleasure in life that comes from human contacts, and you jeopardise seriously your prospects of success. You must be able to bear yourself well in your business life if you are to get on in the world. The more you meet people, the more easy it becomes to meet them, and vice versa.

In many cases the root of the trouble is self-consciousness. The victim has the impression that he is the centre of interest, that people are noting every movement and every word of his. Now obviously this is not the case: people are *not* particularly interested in you unless you challenge attention by blatantness; they are most certainly not in a conspiracy to criticise you. Once you get this conviction well into your mind, you become more at ease. Cease to wonder what impression you are creating, and devote yourself to putting other people at *their* ease: encourage other people to talk about themselves and their affairs (as most people love to do), interest yourself in others, and forget yourself. You will soon find things running

smoothly for you, and a few happy experiences will banish your trouble.

The other common source of embarrassment and lack of ease in company is an inferiority complex. In your heart of hearts you have no confidence in yourself; you feel that you are not up to the level of other people. Some compensate by blatant self-assertiveness, or by becoming "very superior persons"—but let us hope that you won't take either of these courses. Your cure is a little level-headed stock-taking of yourself; your feeling of inferiority is almost certainly unfounded, and is probably due to your having set altogether too high standards for yourself. You may not be an Admirable Crichton or an all-round genius, but there is no need to cry about that. You are probably a pretty sound, honest, and sensible sort of person, pulling your weight and ready to stand by a friend who is in a tight corner. If you reach these standards, be content. You can look the whole world in the face, and are fully entitled to bear yourself with modest confidence and pride.

To sum up.—The qualities that make a person a natural good mixer are precisely those which make him a good and desirable member of the herd. He has a kindly disposition which determines his general attitude to others. He is "human"—interested in other humans, and able to enter into their feelings. He likes to see other people happy, and he is prepared to take some little trouble to help things along in the right direction. He is not coldly selfish, and is able to see all things—including himself—in proper proportion. He is not a "grafter" who regards other people as so many oranges to be sucked dry and cast aside. He is prepared to give as well as to take.

SOME COMMON FAULTS

It is quite possible to be free from any serious flaws in character, and yet to fail to hit it off well with other people through mistakes and faults which are often due to thoughtlessness to a great extent.

Whining.—The man who always has a grievance is shunned, and rightly so. Some congenital grouchers are

just miserable worms ; but some people who are not worms drift into the whining habit, usually during a spell of indifferent health, which renders the skies grey and cheerless. It is a wretched habit. It creeps into the voice, and even alters the cast of features. Good hearty curses we can all appreciate—but not whining. If you really have a grievance, and it can be mended, then go to it with a will ; but don't inflict it upon others who are not responsible for it or concerned with it. If things cannot be mended, write them off, and forget about them as soon as possible. What can't be cured must be endured, and nothing is gained by letting it gnaw at you

Cynicism.—Cynicism, too, is a bad line. A cutting, sarcastic tongue may raise a few laughs, but its possessor is avoided and distrusted. Cynicism springs from a cold, warped, and disappointed soul to which hope and kindness have become strangers. It has little in common with humour, which is the attribute of a warm and cheery nature.

"Carrying corn."—Modesty sheds lustre on success. It is natural for a small child to show off and boast about its little achievements : it is customary also among many of the primitive races, who are singularly childlike in this and in many other ways ; and it is not unknown even among us more advanced people ! Yet an essential part of the process of growing up is to leave behind childish traits.

Reasonable pride in achievement is natural and justifiable. The question is to what extent is it proper to show that pride. The "good old English gentleman" would condemn any indication of satisfaction as bad form ; the Latin would feel perfectly free to indulge in exuberance. Which attitude is the more worthy of approval and imitation ? The exuberant one would accuse the poker-faced one of hypocrisy at least ; and might even claim that to show no satisfaction is the uttermost degree of conceit, since it implies that success is commonplace to him, the sort of thing he takes for granted and as a right because he is such a very, very superior person. I am always suspicious of extremes. I should suggest that we are entitled to *feel*

satisfaction ; that we are not called upon to conceal our satisfaction completely, but that we are bound to see that it goes no farther than that. We must not boast, and we must not strut : we must not become puffed up with foolish pride.

A very offensive manifestation of inability to " carry corn " is to show contempt for weaker opponents. The rabbits must be slaughtered off, of course, but there is no sort of justification for insulting them during the process ; and it is insulting to imply that you hold them and their efforts in utter contempt.

To look at the reverse side of the shield, it is necessary to be a good loser. Every one prefers to win ; but for every winner there must be a loser. A beating should be taken in a generous spirit, without paltry excuses and without " feeling." Temperament—that overworked euphemism for bad temper and lack of self-control—seems to be becoming commoner than it used to be. It is simply spoilt-child-ism in people who are no longer physically children.

Money matters.—A little failing that spoils relations with others is " carelessness " in money matters.

" Neither a borrower nor a lender be,
For loan oft loses both itself and friend."

In practice it is impossible to keep rigidly to this advice. There are occasions when a small loan must be asked, and occasions when a loan must be granted. Many people habitually take advantage of this fact : some are just careless over their own affairs and are always landing into temporary difficulties, out of which they expect their friends and acquaintances to help them ; some make a steady profit out of borrowing, though in their case either cadging or sponging would be the more accurate term. If you have to borrow, do remember to repay on the nail. There is no sort of justification for leaving the man who has helped you to ask for the return of his money. If you are victimised by one of these careless gentry, have no hesitation whatever in pulling him up short. *He* is the one who should feel embarrassed ; he has no right what-

ever to put you into the position when you have to beg your own money back again from him.

A warning.—The natural good mixer is usually a good fellow ; but it is unfortunately a fact that the appearance of good-fellowship can be cultivated as an art—deliberately and for profit. The confidence tricksters who every year reap a fat harvest—mostly from successful business men who should be well able to take care of themselves—are shining examples of the high standard to which the art can be developed ; one cannot but admire their skill, when one reads, year after year, that they have brought off the same old tricks which they were exploiting when we were in our cradles. The criminal confidence man has his humbler law-abiding counterpart in every grade of society—the man who cultivates all his social gifts, and exploits them to his own advantage in one way and another. I would even go so far as to suggest that you should at once be upon your guard with any one who appears to go out of his way to make himself agreeable, at least until you have had good opportunity to see how he “wears.”

A great line with those who wish to use others for their own advantage is flattery in some form or other ; and if they are experts at the game, their judgment of just what sort of soap to use is almost unerring.

Flattery.—We are *all* of us susceptible to flattery. Some of us fall for it in its crudest forms. Others, who would be nauseated by flattery laid on with a trowel, fail to resist it when the approach is more subtle ; few, indeed, of us fail to warm to the acquaintance who *implies*—by his appreciation of our little attempts at humour, by his pleasure on meeting us, by consulting us on some matter of taste, by the attention with which he receives our expressions of opinion, or in any other of the hundred and one ways—that he thinks as highly of us as we like to think of ourselves !

Most people simply *hate* to admit that they are liable to be taken in by “soft soap” ; *but it is wise to recognise that we are none of us completely invulnerable.* We had best allow for the existence of the weakness, and try to train ourselves to recognise flattery in every guise, in order that

we may not be taken off our guard by it. A level-headed individual gives due weight to appeals to his intelligence or to his emotions ; but the individual who is influenced by flattery loses a good deal of his powers of judgment and criticism.

Flattery is not always used to victimise in any way. Some people resort to it in a perfectly commendable desire to give pleasure to others ; they are friendly souls who like to see other people happy, and—properly handled to suit the particular case—flattery undoubtedly does put a man in a good humour. Others take a keen delight in exercising power over their fellow men ; and they, of course, play the game with their tongues in their cheeks, and purely for “the pleasure of the chase.” But there are the others who use flattery as they would use any other means of forwarding their aims ; and with long and patient study, they develop an uncanny ability in discovering the weak points in the armour, and in taking advantage of their discoveries. In one way or another, they use their skill to prey upon their deluded victims.

You are most vulnerable at the points where you are not *quite* sure of yourself. You know, or should know, just how well you can do certain things—those things which you are able to test for yourself. To the extent that you really *know* you are not open to direct attack ; though there is the subtle one with his expressions of confidence that you are a star in the making, or that you could do better if you really put your mind to it, and so on. Your weakest points are those where no real test is possible, and where you are apt to have a bias in your own favour. Your beauty, your skill as a musician, artist or dancer, your taste, your courage, your common sense, your good sportsmanship, your general “soundness”—on all these points there may be varying opinions ; and it is upon such points that you are most liable to attack.

It is pleasant to be appreciated. The man who withholds his approval of real worth is either lacking in judgment or in generosity of spirit. The man who shows his appreciation of real worth proves himself to be a man of sound judgment and good nature. The man who approves where

approval is not due either lacks judgment or has too low a standard. Whether or not you are able to place in his correct class the man who appears to appreciate you or your efforts depends upon the correctness of *your own estimate* of your own qualities and efforts. The better you know yourself, the more honestly and soundly you judge yourself, the less danger you run of being blarneyed.

Wherever you have the slightest suspicion that you are being flattered, take it as proved if you are being pressed to do something by which you may be the loser. Learn from the man who had been completely deceived by the confidence tricksters, but saved his wallet at the last moment by keeping to one of his maxims—"I never part with money, *except for value received.*"

ATTITUDE TO "AUTHORITY"

Have you ever noticed that some people must always be *opposing* something or somebody? If they are playing a game, they cannot accept the rulings of the umpire or referee; in a club, they must always criticise the committee and the management; to them, laws and rules and regulations are just so many interferences with liberty; their seniors in the office (or anywhere else) are incompetent, unfair, and overbearing, even if they are not definitely dishonest and vindictive; generally accepted ideas on art, music, literature, economics, politics, morals and everything else are so much bosh; in short, the whole established order of things is utterly and inevitably wrong. These people may be awfully decent sorts in every way, and yet they seem to be driven always by some perverse, inward force which compels them to set themselves against the stream, to resent and challenge "authority" in any and every form. They seem to be *bound* to disagree; they belong to the rebel type, which forms the backbone of most noisy minorities.

Others among your circle of friends and acquaintances are of the exactly opposite type. They are comfortable, easy-going people who hate strife in any form; they will

put up with a great deal, and are not easily roused. They take their views ready-made from their particular circle, accept what they are taught and what they are told, fall in with everything, observe the conventions, and are happiest when they are following a strong lead in company with a large majority. They are not so noticeable as the rebel type. If a rebel insists upon forcing his views upon them, they probably become uncomfortable. If they are asked *why* they carry on as they do, their first feeling is apt to be one of surprise—it has never occurred to them to do anything else! To them, the established order of things is almost inevitably right. They belong to a too suggestible type—a type which is just a reflection of its environment.

If one of the rebel type sees a notice "Keep off the grass," he is at once resentful, and feels impelled to leave the path and trample on that grass—even though a moment before he was perfectly satisfied to be walking along the path. The suggestible type, if he is already on the grass, will return to the path almost instinctively. The normal individual, who is neither a rebel nor too suggestible, will remain on the path (or return to it); he will have no "feeling" aroused by the notice, nor will he obey it so instinctively as the too suggestible type; without his being aware of it, some train of thought will pass through his mind to this effect—there is probably a perfectly sound reason for that notice, and it is up to me to obey it.

If you think about it, you will almost certainly suspect that there is something queer about the attitude of mind of the rebel. It cannot be normal *always* to be in opposition, to be afflicted with that almost irresistible and instinctive urge to oppose. You are less likely to suspect that the opposite extreme is not quite normal; yet there is something wanting in the individual who *too easily* falls in with everything—a certain lack of independence and initiative, of individuality. The normal person will find himself sometimes in the rebel camp, and sometimes in the opposite camp; you will not be able to say of him—"Oh, well! *Of course* he disagrees. He can't help it!"

Nor will you be able to say of him—"So-and-so is sure to agree to anything."

The trouble with both of the extreme types is that they are governed not by *reason*, but by a *bias*; the rebel type has a bias *against* authority in any form whatever, the too suggestible type a bias *in favour* of authority in any shape or form; the former is impelled by an urge to set himself against the stream, the latter by an urge to go with the stream. It is the bias that decides the attitude of mind; and *bias and clear reason do not go together*.

A bias of any sort is apt to be a misfortune; a bias against authority may well have serious consequences; it is apt to make life very difficult. Continued fretting against things as they are is distinctly wearing, and fritters away a good deal of energy which might otherwise be utilised with advantage. An attitude of resentment to authority is not easily concealed (even when discretion would suggest concealment) and "authority" is often impatient of this attitude, and able to express its resentment forcefully in some way or other. Hostility provokes hostility—it is actually difficult for the "man in authority" to act as he would prefer to act, when he senses a smouldering (and, to his mind, unreasonable) resentment in the person with whom he is dealing. If moreover, any one gets the reputation of *always* kicking against things, his kicking becomes less and less regarded; it comes to be taken for granted that he will kick, because it is his nature to do so; he has cried "Wolf!" too often. In one way and another, the rebel bias may stand in the way of your happiness and progress through life.

The bias, in favour of authority is less apt to have serious consequences; yet it also is a misfortune. Its possessor will probably have a reasonably comfortable journey through life, if things run smoothly; but his lack of initiative and individuality may let him down badly if things go amiss and require strong, independent action; and he is likely to be passed over for any job which requires the qualities in which he appears to be deficient.

The normal individual, who tries to rule his life by

reason, will have no bias either for or against authority as such. He will be mentally free to consider everything upon its merits. He will be able to accept authority easily and without fretting against it, whenever his reason tells him that it is sound and worthy of respect—and even when *discretion* tells him that it will be wise to accept it, at least for the time being. When *he* finds that he cannot accept authority, he will be sure to have excellent reasons; he will be able to state those reasons intelligibly and *without heat*; and he may expect to have them treated with a consideration which the rebel, who *always* kicks, cannot expect.

It will probably interest you to know that, according to psychologists, each of these biases—these mental twists that almost compel a person to be either a rebel or else to be too suggestible—is the result of errors or misfortune in *early upbringing*; and it is surprising to find that the *same cause* may have *either of two quite opposite effects*.

It is normal and natural for the young child to be suggestible, to believe what it is told, to think as its elders think, and to accept authority more or less unquestioningly. This suggestibility enables it to learn a good deal of actual fact, and helps it to fit itself into its little world without undue strain. As the child develops in body and mind, as its physical and mental powers and its knowledge increase, as its environment becomes enlarged, it should, normally, grow gradually towards independence, learning to weigh things in the balance, and to form its own decisions and opinions. This growth towards independence should not be checked, so that by the time the child approaches physical maturity, it should be accepting authority and going with the stream wherever it feels that the authority and the flow of the stream are well directed; but it should also be quite ready to resist authority and to go against the stream when its own reason says that this is the better course. It should *not* have developed an unreasoning rebel bias *against* authority as such, or an unreasoning and servile bias *in favour* of authority as such. The adult should have become able to rule himself by reason; he should not be the slave of a bias.

If, during the early years, authority has appeared too

harsh in some way or other, either of the two extreme attitudes of mind may result; the adult may be a rebel, or he may remain suggestible—that is to say, *too* suggestible for an adult, lacking in independence and initiative, and a slave to convention. *Both the rebel and the too suggestible types have failed to grow up completely and normally.*

I do not think that errors in early upbringing account for nearly all the cases of either bias. Children of the same family, brought up in exactly the same environment, will grow up into adults who are examples of both types. Very young children show marked variation in their attitude to authority almost as soon as they are able to express themselves in ways that we can understand. I think that some children are born with a predisposition towards rebelliousness in some cases, and with a predisposition towards docility in other cases. If you find that you yourself have a bias one way or the other, do not straightway blame your parents, or the others who represented “authority” in your early years. In some cases it needs the wisdom of a sage and the patience of a saint to manage things just so as to strike the happy medium between too much authority and too little authority; and most of the errors are made with the very best intentions in the world. In any case, it is no use crying over spilt milk; it is up to you to deal with the bias if you have it, now that you have reached the age when you can take hold of things for yourself; so don’t sit down and whine about it. Just set about to eradicate it if you can; or to allow for it, so that it does not warp your judgment, if you cannot completely eradicate it.

The bias that renders an individual too suggestible is less likely to lead him into trouble than the opposite bias; yet there is something lost in life if full mental and moral stature is not reached; and from the point of view of the community, I believe that the too suggestible people are the greater tragedy. They supply the great masses who are swayed by appeals to prejudice, and form almost irresistible bulwarks against progress.

The rebel bias is dangerous to your own happiness, and to that of your closer circle; yet it is impossible not

to feel some sympathy with the rebel. He is at least a fighter, and he is always fighting against odds. If you are a rebel, however, I do strongly urge you, for your own sake, to take yourself in hand. The whole world is *not* in conspiracy against you; it is composed of people very much like yourself, some of whom the fates have put into positions where they must exercise some sort of control and direction over others; some conduct themselves wisely and considerately; and, of course, some do not. On the whole, it is best to school yourself loyally to accept properly constituted authority, except where you have sound *reasons* for setting yourself against it. Do not mistake a rebel *bias* for independence of spirit; it is nothing of the sort—and quite probably it is simply evidence of a failure to grow up normally and completely.

It helps you to bear with authority easily, if you reflect that no one within an organised group is an entirely free agent. The private in the army must obey the orders of his officers; the officers in turn must obey the orders of their seniors, and so it goes on right up to the commander-in-chief; and in no other way could the army carry on efficiently. The commander-in-chief must take instructions from the government; and the government depends for its existence upon the electorate. The policeman has to see that certain regulations are observed; he is subject to the orders of his seniors; all of them have very definite duties imposed upon them by law, and must answer for it if they fail to carry them out or if they exceed them; but the laws are made by parliament, and parliament is made by the electorate; so that in submitting to the law, we are carrying out regulations for which we ourselves are ultimately responsible. In whatever form authority appears, there is almost always some fairly sound reason for it, if you care to look into things closely. All this is not to say that authority is *always* entitled to respect and obedience. Probably nothing is quite perfect, even in theory; and when a theory has to be carried into practical effect by human beings, the human factor creeps in; what is good in theory may not invariably work out well in practice.

I do strongly urge you, for your own sake, to "get without" the rebel *bias* if you have it. Oppose and resist anything you dislike so long as you really can base your action upon *reason*; but do not let bias settle your attitude of mind, and then support the attitude by self-deception.

TOLERATION

Have you ever considered the amount of misery that has been caused in the world by lack of toleration for other people's views, tastes, and inclinations? Has it ever occurred to you that you ought to be on very sure ground before you venture to interfere with any one else in any way whatever? Have you determined that all through your life you will repudiate indignantly the claims of others to interfere with your liberty of thought and action, except where they can establish a perfectly clear right to do so? If you have not already given thought to these points, will you do so now and make up your mind to take a valiant part in the fight for real freedom and toleration which is yet only half won?

I want you to consider, as a fundamental point which must be settled first of all, whether *two* have any sort of inherent and sacred right to interfere with *one*, simply because they are in a majority and have force on their side. I suggest to you that *there is no such right*, except in certain exceptional cases. It is quite essential to be perfectly clear on this point before you go any further; for it is obvious that it does not occur to many people at all.

Now let us come to some of the exceptional cases where the two—the majority—can establish a clear right to interfere with the one—the minority. When we have considered these exceptional cases we shall be able to say that in other cases no such right exists.

If three men are shipwrecked and get away in a boat, it is plain that they must take *common* action for the preservation of their lives. The circumstances render it essential that they shall act upon one plan. The boat *can* only go in one direction, the stores and the water *must* be shared. No one of the three can say that he "won't

play." If all can agree, then no question of the coercion of the one by the two arises ; but if there is not agreement, then I think that we must say that the two are morally entitled to force their will upon the one.

Now most of us will not be shipwrecked and adrift in a boat ; but there are many instances in an ordinary community where *common* action is necessary. We must, for instance, have some sort of common plans for roads, drainage, defence, administration of law, postal service—for all those things where the community must act as a whole, as a unit. On all these points I think that we must agree that, if there is a difference of opinion, the majority may fairly claim that it is entitled to overrule the minority. Even here, however, there must be given proper consideration for the interests of the minority. If, for instance, the majority decide that the new road shall cut off half of my front garden, it is only right that the community shall pay me a fair price for my land. Things must be evened up as much as possible—there would be no justification for demanding that I should make a *disproportionate* contribution to the common welfare.

We may say, then, that the majority is morally entitled to overrule the minority, when it is essential that the majority and the minority shall act together as one.

Let us follow our three hypothetical mariners a little further. They manage to make a landing on a deserted coast, and sit down to a palaver to discuss their future actions. Each is now a good deal freer to take his own course ; but they agree to stick together and to strike inland in a certain direction, where they hope to reach civilisation and safety. Notice now that the circumstances have altered in one most important particular : they are no longer compelled by circumstances to act as one, but they have voluntarily agreed to do so until their purpose is achieved. During the course of their trek, to what extent are the two entitled to overrule the one, when they do not all three see eye to eye ? I think that we may say that the two are entitled to insist that the one shall not invite trouble with the natives, consume more than his share of the rations, get drunk (so that the others have to

wait for him to recover or else carry him, since they would not feel justified in deserting him to his fate), or in any other way jeopardise the safety of the party, or lessen their chances of reaching their goal. The two are entitled to demand that the one shall act as a good partner in every way, until such time as the partnership purpose is achieved and the partnership can be dissolved.

In ordinary life a somewhat similar position arises whenever you voluntarily become a member of a group which is formed for some common purpose—such as your school, club, political party, and so on. The majority are entitled to expect that the minority will accept their decisions, and the minority are bound to accept the decisions loyally, until the common purpose is achieved (when the group automatically dissolves) or until the minority detaches itself from the group.

We must now desert our mariners, and take cases which are not so obvious and simple. We shall soon find ourselves on controversial ground.

In a crowded community we are willy-nilly bound to live cheek-by-jowl with our neighbours, and this very closeness of contacts creates problems; we cannot get away from neighbours, however much we may wish to do so—and our neighbours cannot get away from us. To some extent, many of our neighbours' actions are bound to affect us; we are to some extent in the same position as the three men in the boat. We can probably agree that I am *not* entitled to decide whether my neighbour is to be a Catholic, a Protestant, a Mohammedan, or an atheist; whether he spends his Sunday morning in bed, at church, on the golf course, in the garden, or in silent contemplation; whether he shall get his hair cut, wear a collar or an open-necked shirt, be a vegetarian, or be a teetotaller; whether he shall keep a cat; whether he shall go to bed at ten o'clock or come home with the mule in the morning; and so on. On the other hand, he is assuredly not entitled to interfere with *my* liberty of action in any of these directions. In all these and similar cases, any attempt to interfere is nothing less than sheer impertinence.

I suggest that I *may* become entitled to interfere just

so soon as he exercises his liberty of action in such a way that *it interferes with my safety, my liberty, or my comfort*. In a crowded community there must be a good deal of give and take ; some balance must be struck, some compromise must be reached, we must all be prepared to yield a little of our liberty—and in return we are entitled to demand that other people shall give up a little of theirs. If my neighbour has a taste for amateur chemistry it is not my business—so long as he keeps his stinks to himself, and does not risk blowing up my place as well as his own ; but the moment his stinks come drifting into my place and annoying me, I am entitled to object. If he cannot put an end to the nuisance in any other way, he must forego his chemistry. My neighbour's love of music is not my concern ; but if he practises for hours on the trombone, or keeps a powerful loud-speaker going so that *I am forced against my will* to endure his noise, then it *is* my concern, and I am entitled to demand that he shall cease to interfere with my comfort. If my neighbour likes to grow dandelions all over his garden, I may be puzzled at his taste, but I am not entitled to interfere—unless he lets the dandelions seed ; I am very much concerned then, because the wind will carry the seeds into my garden, and I shall have to spend hours of labour to get rid of the weeds that grow from them ; he is interfering with me. If my neighbour's cat comes into my garden and kills my pigeons, or does a little bit of gardening among my crocuses ; if his dog yaps or howls incessantly ; if the water from his roof soaks into my place ; if his new shed blocks the light of my window—in all these cases my neighbour is interfering with me. It is unfortunate that liberty should ever have to be curtailed, but the crowdedness of the community makes it necessary that it shall be, to some extent.

I would suggest, then, that we may be entitled to interfere with the liberty of action of another, when he uses it in such a way that he is interfering with us ; and that we must be prepared to give up a little of our own freedom of action where it would interfere with other people. There must necessarily be a good deal of compromise, when each must meet the other half-way. If any one

refuses to act decently about it, then we are entitled to use compulsion.

We come at last to some of the great battle-grounds of the past; and skirmishes will doubtless continue to take place thereabouts for many years to come. To what extent are we justified in interfering with freedom of action in the interests of the young, the weak (in body, mind, or character), and the helpless? No one nowadays will hesitate to say that there is a right—and a duty—to protect the young or the weak from immediate violence. Most people will go a good deal further and say that the young shall be given such protection that they have a reasonable prospect of growing up into healthy adults, equipped in every way for the battle of life—no matter how much interference may be necessary with the liberty of other people in order to achieve those ends.

The majority of us feel also that the conditions of labour shall be such that we can contemplate them without tingling with shame—that factories and workshops shall be fit for human occupation, that precautions shall be taken against avoidable accidents, that there shall be no sweated labour, that the hours of work shall not be excessive, and so on. The whole mass of social legislation that has grown up during recent years proves that people feel, more and more, that they have both a right and a duty to see that the scales are not weighted too heavily against those who—by reason of their immaturity, their weakness, or their misfortunes—are not able to guard their own interests. We are not concerned with details; it is sufficient to notice that we do, nowadays, feel not merely that we *may*, but that we *should* interfere with liberty of action, wherever it is necessary to do so in order to protect, against unfair and harsh conditions, those who are unable to protect themselves.

How far are we entitled to protect future generations? Are we entitled to say that tainted stocks shall not produce children who will inherit their taints? You would undoubtedly interfere very forcefully to prevent an adult from destroying the vocal cords and the ear-drums of a child, so as to render him deaf and dumb for life. Are you

entitled to say that two deaf-mutes shall not produce children, because their children will probably also be deaf-mutes? Well, we have reached very controversial grounds; and here we may well leave things for the moment.

Let us now consider a case where the majority have forced their will upon the minority, with very dubious results. The United States legislated in favour of "prohibition"—alcoholic drink was to disappear from within their boundaries. Note here exactly what happened. The rectotallers were not resisting attempts to force *them* to drink—in such a case, if one can imagine it, they would have had the support of every fair-minded man and woman; but they were saying that the people who did want to drink, whether they were "soakers" or moderate drinkers, should not do so. I suggest that they were entitled to do so, *if* they were absolutely convinced on two points: first, that drinking caused so much evil to those who were too weak-minded to avoid excess, to their families, and to the nation as a whole, that they must be deprived of any opportunity of access to alcohol—even though, incidentally, the moderate drinkers must suffer loss of liberty too; and secondly, *that the evils of interference with liberty were likely to be less than the evils caused by the drink.* We must assume that the intelligent prohibitionists had convinced themselves on both these points; but it would seem that the facts have now decided against them on the second point at any rate. The excessive drinkers (against whom there was probably a strong case) and the moderate drinkers (against whom, in my opinion, there was *no* case) made common cause with the "bootleggers" to evade the law. Otherwise law-abiding citizens entered into conspiracy with violent criminal elements; this in itself was a shocking state of affairs. The prices of liquor soared to fantastic heights, and the vast fortunes of the bootleggers enabled them to form organisations of gunmen. The whole of the law and the administration of the law lost the respect of multitudes of citizens; and the criminals who were thriving on the illegal drink traffic added other forms of crime to their activities. A problem has been created with which it may be impossible to deal within a decade.

Let us take one more example of "interference," this time nearer home. Great numbers of people like to buy tickets in sweepstakes; they feel that they have a perfect right to waste their spare money in that way if they wish to do so; and they consider attempts to prevent them from doing so to be unwarrantable interference. Please note that they do *not* wish to force people, who do not approve of sweepstakes, to buy tickets; but they do wish to be free to buy them themselves. What is the result? A vast number of hitherto perfectly law-abiding citizens feel themselves entitled—and even impelled—to go to almost any lengths to evade the law which they regard as an intolerable interference. This is a bad thing. Anything which sets people "agin the law" in one way, lessens their regard for it in other ways too; respect for *law*—and not for just the law against sweepstakes—is lessened. I suggest that the people who endeavour to prevent other people from buying sweepstake tickets are not justified in doing so *unless* they are absolutely convinced that sweepstakes do a great deal of harm to people who are unable to look after themselves, and also that the evils of interference are less than the evils of sweepstakes.

Now let us sum up.

I think that you will feel that you are entitled to interfere with the liberty of action of another where it is essential for the good of the community that all must act as one; where he has agreed voluntarily to be bound by the decisions of the majority; where his actions would interfere unduly with your liberty, safety, or comfort; wherever it is necessary to do so in the interests of those who cannot look after themselves—though here the question of degree becomes debatable. This seems to cover most of the cases where interference is justifiable.

I should like, in conclusion, to put in a very strong plea for *non-interference* in any way whatever, except in cases where you feel quite convinced that you have either a *duty* or a *real right* to interfere. If in doubt, *don't*. Take "Live and let live" as your motto in the very widest possible sense.

CHAPTER X

SOME THOUGHTS ON PREPARATION FOR MARRIAGE

MARRIAGE and family life are very much under a fire of criticism nowadays. The critics include the noisy minority of selfish people who are quite unsuited to marriage and who have no intention of undertaking its responsibilities or of suffering its restrictions and discipline; and also an increasing body of serious intelligent young people whose views deserve careful consideration. The latter group realise that it is sheer stupidity to regard marriage as the royal road to happiness; they know that marriage can be just as dull, monotonous, irritating, and generally unsatisfactory as single life, and that it makes it much more difficult for people to reorganise their lives. These young critics see around them obviously unhappy marriages, in which the blissful magic of honeymoon days has given place to a dull apathy or even to a conscious hostility—a slow torture that eats into the soul. They see married people losing their *joie de vivre* and becoming crushed and prematurely aged by worries and responsibilities. They appreciate the appalling helplessness of the individual whose mate is too weak, too selfish, or too stupid to play the game and who fails to realise that both must pull together for the common good. They see marriages bankrupt in everything that makes life worth living; and that the unfortunate victims remain tied together, either for the sake of the children, or because they shrink from admitting to the world at large that they have made a mess of things, or because they cannot afford either separation or divorce. It betrays a pathetic lack of imagination to regard married life as inevitably one long, joyous picnic for two, when the sun shines pleasantly from a cloudless sky and wasps and mosquitoes are non-existent, the camp

fire burns well and the kettle boils quickly, the tea is never forgotten and no one upsets the milk or sits on the butter!

There are those, too, to whom marriage is economically impossible at the age when the sex instinct is strongest, who question why they should not arrange an alternative form of sex association with partners who are willing to join them in temporary "trial marriage" of some sort. So long as they agree to prevent the birth of children, they argue, the matter concerns themselves alone—they are harming nobody. Sometimes these young people have been misled by the pseudo-psychologists who—perhaps as an excuse for their own lack of self-control—maintain that sexual continence is *necessarily* harmful, and that "repression" of the powerful sex urge inevitably leads to all sorts of nervous diseases and other forms of ill-health and to a general lack of efficiency. One way or another they may convince themselves and others that the institution of marriage in its present form has had its day, and is no longer suited to the economic and social conditions of modern times.

Now the argument that continence is necessarily harmful because it involves the repression of an impulse is an example of the error and confusion of thought that arises from the assumption that repression in any sense or form is necessarily harmful. Your common sense will tell you that every day of your life you suppress (or repress) impulses without any sign of physical or mental injury. For example, yesterday I began my day by successfully resisting a strong impulse to finish a most interesting novel that I was reading the night previous; common sense told me that it was better to carry on with the work that awaited me. Can one seriously suggest that this suppression or repression did me any harm whatever? I could give several other examples of impulses which had to be resisted and thwarted during that same day; and I am sure that if you, too, look back on the events of any one of your days, you will be able to find instances of repression from which you have suffered no harm. I have dealt more fully with this point in the chapter "How the Mind Works," and I

would like you to read this most carefully when you are considering the question of continence and the sex impulse.

When an irregular sex association is being contemplated, it is well to bear in mind that, besides the loss of caste resulting from the inevitable furtiveness, there is the serious danger of producing an unwanted child; for *there is no absolutely reliable method of contraception*; you may have to choose between inflicting the handicap of illegitimacy upon the child and marrying some one whom you would not willingly choose for your life partner.

In practice, these relationships rarely turn out satisfactorily. The insecurity and lack of permanence often lead to unreasonable jealousy and irksome possessiveness. More often than not, one (generally the man) tires first; and although the two people concerned may have agreed in the first place that their relationship shall be temporary, and that it shall cease when either of them finds it no longer satisfying and helpful, the break is almost always distressing and hurtful. As Kenneth Walker has said:

"It promises so well, but one thing has not been taken into account, the emotions. A man and a girl may plan with their minds, but their hearts owe no allegiance to the working of the intellect. The intellects of Chelsea and Bloomsbury move in the twentieth century, but their emotions lag behind in the primitive ages."

Personally, I have been the confidante of numbers of young people who have come to regret bitterly their pre-marital sex experiences; and this most often happens when they meet some one whom they wish to marry.

THE PLACE OF MARRIAGE IN SOCIETY

Marriage is legally a contract between a man and a woman to observe definite obligations towards each other and towards their children. In most cases there is a religious as well as a legal sanction. A normal marriage is the preliminary to the foundation of a family; both primitive and civilised people regard a childless marriage

as something of a failure. The institution of marriage is essential for the stability of the family, and the preservation of the family is to the advantage of the race. There is a tendency for the State to take over more and more of the duties and responsibilities of parents; but the object of this appears primarily to be the protection of those children who would otherwise be neglected by irresponsible, inefficient, or impoverished parents: the State endeavours to ensure to the children the necessary minimum for physical and mental well-being. Those extremists who would abolish family life entirely and have the children brought up in State nurseries overlook one very important fact—that children have other needs than those of the body, needs which no public institution can supply. The State cannot supply the child's psychological need for the influence of both mother and father and for the background of security which only a happy family life provides. The fact that some families are ill-adjusted and unhappy in their home life is not sufficient reason for abolishing the institution of the family. The normal family atmosphere, provided by parents who live in harmony and affection, is almost certainly the best for the development and happiness of the child, and therefore the best for the race.

The existence of unhappy psychological "misfits," who in youth are unable to adapt themselves to family life, and who as adults are incapable of making a success of marriage and parenthood, should not be allowed to obscure the fact that, for the large majority of folk, marriage gives the best conditions for normal psychological development and for the achieving of the biological aim of life—parenthood. Monogamy, or mating for life, is the highest level of the sex relationship: it enables the parents to co-operate in the care of their children throughout the years of childhood and adolescence.

Instead of suggesting the abolition of marriage and family life because some marriages are failures, we should emphasise the need for more careful thought and preparation for marriage. A career is only part of your life; marriage, in its fullest sense, is the whole of it, and involves not only your own happiness and welfare, but also that of

the mate you choose and of the children who may be born to you. Yet there are people who will spend years of effort in preparing for success in a career, but who expect marriage, with its difficult psychological adjustments and its great possibilities for happiness or misery, to make a success of itself. They expect life-long happiness just to happen to them. Well, it probably won't just happen: it must be planned and worked for intelligently.

THE CHOICE OF A MATE

The outstanding events in our existence are birth, marriage, and death. Over our births we have no control at all: we cannot choose our parents or the circumstances into which we are born; we cannot select the qualities of body and mind which we inherit from our ancestors. Over death we have but little control: by clean and intelligent living we can postpone death—we can prevent a premature death as a climax to a life of poor health. Over marriage and parenthood we have a great deal of control, and we must therefore assume a great deal of responsibility.

Not so very long ago it was sheer hypocrisy to talk of a woman's "choosing" her mate, in nine cases out of ten she waited for marriage, hoping that some man would choose her. Marriage in those days was a woman's best paid job; for unless she became a governess, a nurse, or a domestic servant, under conditions that would to-day be regarded as intolerable, marriage was her only alternative to acting as housekeeper-secretary to ageing parents, often with the prospect of bleak loneliness and genteel poverty later in life. One can understand and sympathise with the determination of the Victorian girl to marry at all costs so as to escape the penalties and social reproach of being an "old maid." Happily all this is changed, and there is no excuse for the modern woman's adopting this unsatisfactory attitude to marriage. The bachelor girl of to-day has greater scope for a full, interesting, and satisfying life than was ever dreamed of even by the rebels of the Victorian age. To be able to say "A poor thing, but mine own,"

does not justify a woman in marrying some one whom at heart she rather despises, even though the economic situation and the shortage of eligible men limit the opportunities of marriage.

Difficulties.—Of the many difficulties in the choice of a mate, there are two in particular that are apt to lead to disaster; and preparedness for these difficulties may make all the difference between success and failure in overcoming them.

The first of these difficulties is the inevitable result of the immaturity of youth. Youth cannot have the seasoned judgment of later years, and therefore the qualities of a possible mate may not be assessed at their true values. That first serious love, which at the time appears to be eternal, may be but the love for an ideal. It is often the emotional expression of the surge of adolescence; the beloved is endowed with all the attributes of the hero or heroine of some favourite story or of the particular film star who has temporarily fired the imagination. In later years, we come to thank our stars that something happened to break our young hearts and save us from a quite unsuitable marriage. At seventeen our ideal of a mate differs very materially from that which we shall have ten years later; and young people should bear in mind that although they may start married life at an early age, marriage is intended to last for the rest of their lives.

The second difficulty is a very formidable one, and failure to overcome this may entail most cruel penalties. When one is under the influence of the sex urge, one can hardly hope to see things in their proper perspective. The sex instinct is an extremely powerful one, and is apt for the time to warp the judgment and distort the vision. Nature's interest is in the perpetuation of the race, and not in the happiness of the individual adult; and so the dice may be loaded heavily against you in the choice of a mate. Nature regards you simply as a potential parent; it is for you to assert your determination to be a happy individual. The time for you to take stock and consider carefully the qualities which for you are essential for success in marriage is *before* you are in love and half blinded by the

"rose-coloured spectacles of passion ; you will then be far less likely to drift into an unsuitable love affair. A happy marriage is a sublime and wonderful experience : it warms and enriches the whole personality, and brings out all that is best in nature ; but an unhappy marriage may mean a life sentence of blank misery, during which all the fine and generous impulses become shrivelled and warped. If only all marriages were arranged with a clear consciousness that the early passion and glamour of marriage will inevitably wane with the passing of the years, and that there is little hope of permanent happiness unless there is compatibility of temperament and a solid basis of respect, affection, and loyal comradeship, then there would be fewer of the tragic failures.

In spite of the insistence of novelists on the common occurrence of "love at first sight," I believe that it is, in fact, a rare event. In a majority of cases, engagements happen simply because two attractive young people are thrown together in circumstances which chance to be favourable. In some cases marriage is seized upon as an escape from loneliness ; in others, a determined hunter (of either sex !) persistently pursues a mate, and the unsuspecting and unresisting prey may blunder into a thoroughly unsuitable marriage through sheer inertia. Some people are driven into marriage as an escape from possessive and cramping parents. There is yet one other not uncommon set of circumstances that may lead to an unsuitable marriage : one or other of the partners may be "caught on the rebound"—to use a popular phrase—after an unsuccessful love affair. The desire for sympathy and for the healing of a wounded vanity may well be mistaken for love. Of course such marriages may, and often do, turn out well ; but marriage is far too serious to be left to such a chance, as though it were no more than taking a dip in a bran-tub.

We should bear in mind that most of married life is spent in the humdrum routine of "the daily round, the common task" ; for every moonlight hour on a ship's deck or on the river, for every hour spent in the glamorous atmosphere of the ballroom or the cinema, there will be

many thousands of hours spent at the breakfast table on grey winter mornings.

Do realise, then, that you may just drift into an unsuitable or even disastrous love affair ; and give some thought, now, while your critical faculties are clear and unbiassed, to the choice of a mate. If you secure the right mate for you marriage and parenthood are the supreme achievements of life and lead to an exquisite and satisfying happiness which has to be experienced in order to be fully appreciated. I am convinced that for normal people a happy marriage, with children growing up, offers the best that life can give.

Importance of choice.—Marriage is a career that gives scope for the greatest development of character and personality, a career that, perhaps more than any other, calls for intelligent preparation and life-long devotion. What *you* make of marriage will depend upon you *and upon the mate you choose*.

Even an unhappy marriage may have a great deal of value in developing the character. The responsibilities to be faced, and adaptability and self-control demanded, may develop in you latent possibilities, and the result may be an altogether finer and richer personality. Yet the consequences of an unhappy marriage are so important to the married partners and especially to their children, that only an irresponsible fool would take avoidable risks. Happiness in marriage will not "just happen" ; you must plan for it and work for it—and perhaps the most vital part of your preparation is the right choice of a mate.

It is a fact that one's fancy may be caught by a trifle—a touch of brogue, a wave in the hair, a dimple, a silvery laugh, or even by some small mannerism. When the sex call is strong, this fancy may give direction to it ; but your choice of a mate is too gravely important to be determined, or even influenced, by trifles. You must be sure of a necessary minimum at least of the fundamental qualities which have vital influence upon the prospects of permanent happiness.

Health and heredity.—A clean bill of health, and an absence of hereditary disease or deformity in the family

history, is of the first importance. You should consider your mate as the potential parent of your children, a parent who will contribute 50 per cent. of the germ plasm which carries the good and bad qualities with which your children will be endowed. If you have read the section on heredity, you will realise that a family history may reveal that a person, who appears normal, may in fact be a hybrid who carries recessive undesirable hereditary qualities; and that if you marry such a person, you run the risk of defectiveness in your children. If there is any doubt on this point, you should discuss the matter with your doctor who will be able to judge whether, in any particular case, there is a likelihood of a tainted germ plasm. It is for you to judge whether you are morally justified in being partly responsible for the birth of a mentally defective, diseased, or crippled child.

Since health is such a vital factor in the well-being of the marriage team, it is necessary to have a clean bill of health on marriage, and also a health conscience, a recognition of the moral obligation to *keep fit*, to *prevent* illness in the future. I have known people who had a clean bill of health when they married, but who through laziness, stupidity, and self-indulgence have subsequently disregarded the simple laws of health and degenerated into chronic invalids, so that instead of being able to pull their weight, they have become a drag on the team. To my mind, this is a form of cheating which may have most serious consequences for both partners in the marriage. Of course, I am not speaking of the acute illnesses that may be our misfortunes in spite of reasonable health care, for these occasions call for sympathy and help; but rather I have in mind the slow but steady degeneration of body and mind that is the common result of chronic ill-health. Perhaps because of my medical knowledge and experience I tend to over-emphasise this danger—and yet I cannot think that I do so. I have seen marriages wrecked, children robbed of the light-hearted joys of childhood, and homes made bankrupt by *preventable* ill-health. “X” in good health, and “X” when he or she has degenerated into a querulous or morose semi-invalid, are two very different

persons. In the first stage "X" may be a charming and attractive companion and helpmate ; in the latter a depressing and irritating burden. The present state of good health may be due to a strong constitution and to the marvellous resilience of youth. Nature allows long credit during early life, but sooner or later—usually about middle-age—she presents her account for payment. If "X," with apparent impunity, is now disregarding the laws of health, by drinking too many cocktails or other short drinks, by continually inhaling tobacco, by over-eating or irregular or unsuitable meals or other forms of self-indulgence in food, or by turning night into day and neglecting rest, sleep, and fresh air—you may be sure that the reckoning will come in due course. "X" may now be an amusing and attractive companion, but he or she is utterly unfitted for the life-partnership of marriage in which health plays so vital a part. You should value highly *the sense of duty to keep fit*.

Mental alertness.—It is most desirable that your marriage partner should have the energy and the intelligence to keep mentally alert, by taking an interest in affairs outside the home circle, by trying to keep reasonably *au fait* with the world at large. Boredom is a great enemy of married happiness ; and those who, on marriage, settle down and become mentally flabby must not be surprised if their partners look elsewhere for companionship. If in any marriage one of the partners continues to develop mentally while the other just stagnates, their ways will inevitably drift apart.

Personal appearance.—Those who tend to be slovenly in appearance, who are not consistently well groomed, are not likely to improve after marriage—quite the reverse, in fact. Personal slovenliness eats into the bone and affects the whole mental outlook. Moreover, it is a sure indication of the standard that will be set in the home after marriage. It does not cost much to have clean skin and well-kept hair, teeth, and nails, clothes well pressed and mended, and shoes and gloves in good condition. You may think that these are trifles ; but your whole appearance is made up of trifles like these, and only stupid people think

that appearance does not matter. You must not expect your children to take a pride in their appearance unless the home sets a reasonable standard. Don't marry a slovenly person thinking you can reform him (or her), because you can't. Reformation should come *before* marriage.

Outlook.—The chance of harmony in marriage will be the greater if both partners agree sufficiently in religious, moral, and political outlook. Marked differences of opinion in these matters often lead to friction and hostility, since they indicate an inherent difference in point of view, in the way of looking at things ; and a serious lack of sympathy may in time begin to show itself. If, for instance, you agree on the moral obligation to live within income and to insure against sickness, unemployment, and old age—if you *both* feel that it is a moral duty not only to pay your way but also to provide for the unforeseen claims on income (so that in a financial crisis you do not have to collapse upon others)—your married life is the more likely to run smoothly. The thriftless type of person who parades a spurious generosity—ultimately at the expense of others—is not likely to make a success of the domestic budget in married life ; and he or she is quite likely to regard as timidity or meanness thrift and a determination to meet obligations even at the cost of personal sacrifice. People who have no proper money sense are usually at least fools. The time to display generosity is after provision has been made to meet present and future obligations. True generosity is not a reckless prodigality, but a complete absence of that meanness which is of the soul. If you personally abhor debt, and you marry some one who has no scruples whatever about living on credit, you deserve what you will surely get from your married life. These, and other ethical problems, should be fully discussed before marriage.

Children.—Some people marry with no intention of having a family. If both partners are agreed on this, when they become engaged, well and good : they may have good and sufficient reasons as a justification. They may, for instance, quite rightly consider it a moral duty to deny

themselves the satisfaction of parenthood rather than take the risk of handing on a germ plasm, which they know to be tainted, to children who consequently may be born physically or mentally defective. They may both dislike children and honestly feel that they would not make good parents and would be unable to provide the right home atmosphere for the normal development of children. There are those, too, who for economic reasons agree to marry and postpone parenthood until they can afford to have a family, as an alternative to years of waiting until the economic situation improves sufficiently to enable them to marry and rear children. Thus may be the alternative to a furtive and irregular sex life. In many cases it is necessary for the wife, too, to contribute an income to the home, so that she must carry on with her job for a few years. These are circumstances in which marriage must be modified in adaptation to the economic conditions which are characteristic of modern times; and, however regrettable such postponement of parenthood may be, it is preferable, for the individuals concerned and for the race, to the alternatives. I want to emphasise that there should be full and frank discussion concerning children *before* marriage. Normal marriage naturally involves parenthood, and if you marry a mate who desires children and you conceal from your mate the fact that you intend to evade parenthood, you are committing a cruel fraud that may well wreck the marriage. It is no excuse to plead a false modesty: honesty demands that you should express your views on this subject, as on others that concern your joint happiness, *before* marriage—indeed, *before you enter into an engagement*.

Medical overhaul.—It is most desirable that there should be a medical overhaul before marriage, not only to ensure a clean bill of health, but also to detect any physical abnormalities that would be an obstacle to the normal sex act and would therefore prevent the proper consummation of the marriage. (A marriage is said to be consummated when the first complete sexual intercourse has taken place.) Even more important is it to make sure that there is no physical obstacle to parenthood. This consultation with

your doctor is a good opportunity for the final sex instruction to prepare you to make a success of the physical sex side of marriage. Your doctor may be able to advise some suitable book on the subject to give you a sane and proper attitude to sex life in marriage.

Cousin marriages.—I am frequently asked if the marriage of cousins is unwise. If you refer to the section dealing with heredity, you will realise that, *provided the cousins come of healthy stock*, there are no reasons whatever against cousin marriages. There are records of families of outstanding mental brilliance and physical fitness which have been founded by cousins. If, however, there is hereditary disease in the family, or if the stock is definitely below normal, so that the common germ plasma is tainted or of poor quality, then any defects are likely to show themselves very markedly in the offspring of the marriage of cousins.

Cancer and tuberculosis.—In regard to such diseases as cancer and tuberculosis, I know of no evidence that these can be inherited. A predisposition to become infected with tuberculosis is very likely transmitted from tuberculous parents; and the children of such parents should lead a healthy, open-air life, with good nourishing food and protection from the specific infection. Nowadays, few people are ignorant of the fact that the secretions (sputum or spit) of people suffering from phthisis (tuberculosis of the lungs) contain the germs of the disease, and may therefore transmit the disease to others. The germs can remain alive for years in dust and dried secretions, and infected people who cough and spit about may be a source of infection to their own families and to others. I need hardly say that those who are actively suffering from tuberculosis should not marry; and that those who have had the disease should, before arranging to marry, consult a doctor for an assurance that they are now completely cured.

Venereal diseases.—In no circumstances should people suffering from venereal disease marry or have sexual intercourse until they have been completely cured. Illicit sexual intercourse is mainly responsible for the spread of

venereal diseases, and many prostitutes are infected. The need for proper medical treatment, continued until a complete cure can be guaranteed, is imperative if grave and possibly fatal results are to be guarded against; and the sooner after infection the treatment is commenced, the more speedily can the disease be cured. *I wish most emphatically to warn young people against putting themselves into the hands of unqualified persons for treatment if they suspect that they have contracted venereal disease.*

ON HOME-MAKING

Most people marry with the intention of running their homes so that they shall have leisure for rest and recreation and so that their families are happy and comfortable. To do so requires intelligence and a special knowledge and skill; it also requires a proper sense of proportion—an attitude of mind—that enables one to rise above trifles and to recognise that the primary purpose of a home is to add to the happiness, comfort, and well-being of its inmates, and not to provide a storing place for immaculate cushions and chair covers that must on no account be crushed. The homes which look exactly like the show-rooms in a furniture store are cold and impersonal; they lack the personal touch—the real charm of a home which distinguishes it from an hotel. In considering the material aspects of home-making, then, do not overlook the importance of creating the right atmosphere. One needs to strike the happy medium between becoming a slave to one's possessions and living in an atmosphere of muddle and slovenliness and inefficiency which leads to irritation and waste of time, money, and energy.

General organisation.—The health and general well-being of the family is largely in the hands of the wife. She can by good management add enormously to the comfort of the home, so that those members of the family who are out at work during the day return to a cheerful and peaceful atmosphere, and not to the clatter of domestic earthquakes and a tired, dishevelled, and fretful woman

whose main conversation is about the shortcomings of the daily maid or the troubles of the neighbours. The stupid, slovenly type of wife who muddles along so that she has no leisure for rest and recreation herself is bound to become dull, mentally flabby, and generally unattractive. Intelligent planning of the day's work can make an amazing difference to the expenditure of energy and to the available leisure. The woman who before marriage is a muddler at home and in her job, unpunctual in keeping appointments and generally unreliable (or "temperamental," as she may prefer to call it), is not likely to make a good job of running a home after marriage. If you find in yourself a tendency to slovenliness of mind and body, it is not too late to take yourself in hand and correct it *before you marry*; and such self-discipline and eradication of bad habits should be regarded as part of your preparation for marriage. In the home the wife is the managing director of the firm, and if the firm's balance sheet is to show a good profit in the way of health, happiness, and prosperity, the managing director must know her job and have the energy and intelligence to do it well.

Cooking and food values.—No woman should undertake to run a home, whatever her social position, unless she has a thorough knowledge of what is meant by a balanced diet, and of how to cook food without impairing its health value and of how to serve it attractively. She should know what foods are essential for health, and how to get the best value from the money at her disposal. Many people suffer from malnutrition not through poverty but through ignorance of food values, through incapacity to select nourishing and appetising foods which are also cheap; a grilled herring is every bit as valuable a food as the most expensive cut of salmon! Few wives would be so callous as to injure deliberately their husbands and children; yet many do so unwittingly through their ignorance of elementary food values and of the relation of diet to health. It is wisdom, then, to prepare yourself before marriage by acquiring the necessary knowledge and skill. You should take a pride in being able when necessary to serve an attractive, well-balanced meal *at the minimum*

cost, so that you will be able, should the need arise, to pull your weight in protecting the family from unnecessary suffering and injury to health through malnutrition; and you should be able to do this, even if you marry a man who is well-to-do.

Home nursing, first aid, and mothercraft.—There are few homes in which illness or accident does not occur, and the wife who is quite helpless in such circumstances may cause her family unnecessary suffering even if the results are not more serious. She will fail when she is most urgently needed. If you equip yourself with the necessary knowledge and training in nursing and first aid you may be able to shorten many illnesses and prevent others, and the family will benefit through having fewer and smaller doctors' bills.

If you have time before marriage to study infant welfare and health care during pregnancy, so much the better. In any case, do realise that knowledge of these matters does not come by instinct in the civilised conditions in which we now live: it should be learnt before the responsibilities of parenthood are undertaken. Children can be injured by the ignorance of affectionate, well-meaning parents as well as by deliberate neglect.

Needlework and laundry.—The wife who can knit and is skilful with her needle and sewing machine, who can make and alter clothes, will be able indirectly to add to the family resources, because the clothing allowance can then be made to provide much better value than it will if all garments must be bought ready-made and discarded because they have become "out of fashion" although they are nothing like worn out. Some of the best-dressed children I know have many of their garments made at home from the discarded clothing of their parents. The home laundry is important, too. For instance, woollens will last twice as long, and will be much more healthy and more comfortable to wear, if they are properly laundered. I have seen unfortunate children irritated and partially asphyxiated by woollen vests that, by repeated bad washing, have come to resemble thick felt.

In conclusion, there are few girls so situated that they

are unable to get the necessary knowledge and training in all these subjects as part of their preparation for marriage. In most districts evening classes are held throughout the winter months; and for those who are unable to attend such classes there are excellent practical books on home management, diet and cooking, home nursing and first aid and mothercraft. In these days there is really no excuse for ignorance.

To the husband-to-be.—Fortunately the old narrow view that it is unmanly for husbands to take a practical interest in the domestic affairs of the home is fast disappearing. Times are changed indeed! Although in homes where the wife has no other claims on her time and energy than those of her home and family the husband confines his activities to gardening and “odd jobs” about the home, he should be able to lend a hand in cooking and household duties when the need arises. Indeed, during the week-ends there is much to be said for sharing the indoor duties so that the wife may lend a hand with the garden and get the benefit of exercise out of doors. It is usually the effeminate type of man who is so jealous of his masculine dignity that he scorns taking a practical interest in domestic affairs; indeed, some of the most virile men of my acquaintance are excellent cooks and can turn out a dinner that would put many housewives to shame. We will say nothing of the state of affairs in the kitchen afterwards!

There is no doubt that the husband can add considerably to the standard of comfort in the home if he has a knowledge of gardening (where there is a garden, of course) and some practical skill in carpentry and household repairs. This skill he may well acquire as part of his preparation for home-making. There are books on home mending and repairing, and books which enlighten you on the mysteries of locks, taps, cisterns, and other parts of a house that may need little attentions.

Mutual consideration.—This I would say to both sexes. The husband should bear in mind that his wife may have spent a dull, monotonous day in the home, and be looking forward to his home-coming for relaxation in the evening. The wife should remember that her husband

may have spent a trying and exhausting day at work and be badly in need of an hour's quietness and repose. If *before marriage* these circumstances are faced together and discussed, a reasonable compromise may be arranged and the danger of misunderstandings will be avoided. Mary will not suspect that John has ceased to take an interest in her because after supper he sinks into his armchair with the newspaper; and John will not think that Mary is lacking in proper consideration because she has arranged for a friendly game of bridge later in the evening. As far as possible, both should arrange the work so that they have leisure and energy for companionship and for mutual enjoyment of the pleasures of the home and for interests outside the home. In so far as they can share interests and hobbies, their married life will be the richer.

Two qualities which I think are most valuable in marriage are tolerance and a kindly humour. Always respect personal tastes and idiosyncracies, and don't try to reform one another. Any reformation should take place before, not after, marriage. It takes all sorts to make a world, and if you keep in mind the Biblical exhortation about the mote and the beam, you are more likely to live together in harmony.

CHAPTER XI

SEX PROBLEMS

MASTURBATION

Masturbation covers any method of provoking pleasurable sensations by stimulating the genital regions. You may be surprised to learn that infants in their cradles are apt to develop the habit: during infancy the genital regions are very sensitive.

At puberty the physical changes are sufficiently obvious and striking to provoke attention; and there are usually some in a circle who are unduly interested and have all manner of weird and wonderful misconceptions on matters of sex. Often, too, somewhat older individuals who are addicted to the habit are only too anxious to encourage their juniors to indulge in it.

The practice is quite common at this period of life, but it is usually dropped as soon as the curiosity is satisfied. It is, in a way, a resumption of an infantile interest, and the youngster who is growing up normally *in every way* very soon loses interest.

A great deal of real distress and harm is caused by well-meaning adults, and also by adults who are not well-meaning—the former through ignorance; the latter for profit, since they make a profit by selling pamphlets, books, and “cures.” Medical opinion is that the vast majority of adults have practised masturbation at some time or other: it is obvious, then, that masturbation does not usually cause any permanent harm, otherwise the majority of adults would be showing symptoms. It seems to be an undoubted fact that occasional masturbation causes no more than slight, temporary harm—mild headache, a feeling of lessened well-being, a loss of tone and fitness: but that it may do more harm, if it is practised habitually and to excess. But it certainly *won't* cause insanity or

permanent impotence or any of the other bogeys of the scaremongers. If by chance you have been misled by these people, take heart : they have been talking utter nonsense.

What does cause real harm is the distress due to feelings of fear, disgust, "sin," etc., and all this distress is *absolutely unnecessary*.

There is, however, nothing whatever to be said for the practice. If it does no harm, it most certainly does no good. The fact that a single act of indulgence will often cause headache and other mild symptoms is a clear indication that it causes some *temporary* harm. It cannot be regarded as an æsthetic habit, and it is a reversion to the infantile. It seems strongly probable that it is wise to use every part of the body for its proper and natural function, and for no other. There is no *need* to masturbate either in order to prove that you are capable, or in order to get rid of excessive secretions. You are quite safe in leaving both these points to Dame Nature, who will see to both for you in her perfectly efficient way. There is, too, some risk of habit formation.

If the practice is not soon outgrown, or if indulgence becomes excessive, there is usually some physical or emotional cause. It is wise to consult your doctor, who will soon put right any physical trouble; and if the trouble is not physical, he will be able to introduce you to another properly *qualified medical practitioner* who specialises in such cases. More often than not, however, the sufferer can cure himself : a hard vigorous life with plenty of healthy interests is often all that is needed ; there may be occasional lapses, which will become rarer and rarer. It is the studious, lonely, and introspective types that are most prone to habitual excess.

CONTINENCE

The stages of sex interest normally run roughly thus : At puberty the profound physical changes provoke some interest in sex ; but this interest does not focus itself definitely upon the opposite sex, and certainly not upon individuals of the opposite sex : it is the phenomenon of sex within oneself that commands attention.

The interest wanes and may seem to disappear almost completely for a time; but there is more usually a gradually increasing awareness of the opposite sex when they are present, which may express itself either in shyness or in vague pleasurable sensations.

This gives place to a stronger interest in individuals, but it is usually a general rather than a particular interest. The nearly adult youngster feels strongly attracted towards girls (or men) and has delightful but passing fancies for particular individuals. This is a valuable training period, during which one finds one's own feet, and, by conscious or unconscious comparison, becomes drawn towards the type which will probably provide a suitable mate.

The last stage, which normally comes some time after full physical growth has been reached, is an extremely strong attraction towards a girl, or a man; the sex attraction is but part of the attraction the individual experiences for this chosen individual, who should, in the ordinary course of things, become the mate.

If things run quite normally with you, the sex urge will not be anything of an obsession, nor will it be a nuisance; and continence will not prove to be difficult. It is a fact, however, that the sex urge does prove troublesome to many: the causes are various. Some youths, for some extraordinary reason, develop doubts as to their virility, and feel compelled to prove to themselves that they really are men. There may be associates, and particularly older associates, who preach that sexual experience is a fine and manly thing—a thing that one *ought* to have. The rebels feel impelled to have an "affair" because convention is against affairs. Quite a number of youngsters are misled by misinterpretations of psychology. (Look up "Repression" again.) Many are more or less willingly seduced. Some play with the fire and find that at a certain stage of stimulation and excitement their self-control disappears. Alcohol is responsible for many first steps. Some few are really more strongly sexed than the normal—but, queerly enough, the man who is obsessed by sex is at least as likely to be less strongly sexed than the normal.

To the perfectly normal, vigorous, active, busy youngster, sex should not become an obsession or a nuisance, nor should continence prove any great difficulty to him (or her, of course), provided always that he *wishes* to be continent, and avoids stimulating the sex urge by erotic reading or films, alcohol, by injudicious "flirting," or in other ways.

There is no tittle of evidence to show that continence is necessarily harmful—the evidence is rather the other way. Continence in marriage, by the way, is quite another matter, and is not here under discussion.

You may, however, ask whether there are any special arguments to be put forward in favour of continence; as a matter of fact there are several, which, taken together, are to my mind conclusive.

Irregular affairs have to be conducted furtively, and furtiveness is in every way an undesirable thing. There is undue emphasis on the purely physical aspect of sex, and this may so influence your attitude to sex that you are never able to view it sanely and cleanly as one of the most wonderful and beautiful things in life. You may—and quite probably will—regret your earlier experiences once you become ideally in love with the mate whom you marry. If once you begin, continence becomes less easy in the future. There is always risk of venereal disease; and *there is no 100 per cent. efficient method of contraception in existence.*

Sublimation.—If you are naturally strongly sexed, or if some way or other your sex urge has become so stimulated that it is becoming a nuisance, there is still a solution to your difficulty if you wish to remain continent. It would almost seem as though there is within you a total urge, from which springs the energy for all the impulses which make you want to do things; and that of this total urge, the sex urge is a part. If you throw yourself vigorously into other forms of activity, physical and mental, in a way you draw upon this total urge, and have less of it for the sex urge. In common parlance, one interest can "take your mind off" another. If you like to look at it in another way—the force of the impulse to which you do

not wish to give expression in one way is redirected and finds an outlet in other ways.

Even so strong an urge as the "maternal instinct" can be expressed and almost completely satisfied in other forms of "motherliness," such as caring for other people's children, or for the sick or weakly. The term used for this redirection of an impulse (which is not to be given free play in its original form) into socially commendable channels where it can be allowed a sort of substitute expression, is sublimation.

SEX ABNORMALITIES

It may be of practical interest and value to you to know that a person who is physically a male or female may not have the normal attraction towards the opposite sex, but may actually feel attraction towards his or her own sex.

By some authorities it is held that such abnormality is due to internal secretions, so that it is a matter over which environment has no influence; but other authorities have a quite different opinion. It would take some time to detail the explanation given by those who disagree with the secretion theory; but briefly it comes to this—the boy and the girl both pass through stages of development in which they are (quite normally) emotionally attracted towards their own sex. These stages should pass, so that the adult's sex attraction finally is towards members of the opposite sex only. But the development may be checked at an earlier stage, so that the adult continues to be attracted towards his or her own sex for life. If this latter explanation is correct, it becomes necessary to warn you against the risk of bringing the trouble upon yourself: both sexes need to be on their guard against allowing friendships with members of their own sex to become too intense, or too passionate, and to be particularly cautious where the friendship is with older individuals of their own sex.

It is a remarkable fact that many of these "homosexuals," as they are called, whose real attraction is towards their own sex even when they are adults, *have no know-*

ledge or suspicion of their own condition, and so, of course, have never been addicted to "homo-sexual practices." Many of them are people of the very highest intelligence and character, and much given to noble philanthropic work. As you would expect, they are most commonly to be found working in movements which are carried on for the good of their own sex. For goodness' sake, don't get the idea that *all* such people are (unknowingly) homo-sexuals: it is difficult to give figures—estimates vary from 1 per cent. to 5 per cent. for men. I have mentioned this by way of warning, and it is to be read in conjunction with what I have said just above about friendships.

CHAPTER XII

IN CONCLUSION

I AM going to assume that you have the intention and the strength of will to guard your physical health: that you have determined to achieve mental health by habits of mental honesty; that your knowledge of the wonders of reproduction has established a sane and clean view of sex; that you mean to be a good, sound member of the herd; and that you propose to take your fate into your own hands and control it to the best of your ability.

There still remain some topics upon which we have not touched.

THE MAIN CHANCE

Choice of a career.—Much is heard nowadays about square pegs in round holes—possibly too much. Obviously, if you have a choice, it is well worth while to get into some line where the work will be a pleasure to you; you are likelier to make a success of things, but there is an even more important point—you will be happier (and therefore fitter) if you find enjoyment and zest in your job than you will be if your work is a drudgery to which you submit grudgingly because it pays for your bread and butter.

You may have to make your choice before you yourself

work in different jobs. A further difficulty is that you cannot have a job made to suit you; you have to take one of those which are actually available. Most schools have advisory committees, which include a representative of your school—who may well have a much shrewder idea of your gifts and tastes than you have yourself—and also some one whose speciality is a knowledge of jobs and the

labour market. Between them they should be able to give you sound advice.

If you have no special gifts and no marked tastes, you may still have a general inclination towards constructive and practical work rather than clerical work, towards an outdoor life rather than an indoor life ; and such a general inclination will be some guide.

You may have to admit to yourself that you fear responsibility and risk, and yearn for a "safe" job of some sort. I think that you should take yourself seriously to task if you feel this way about things: it may be merely a hang-over from the childish fear of the unknown. Youth is normally adventurous. However, if you *are* convinced that you will not face responsibility and risks, you had better run for safety.

Whatever job you do take up, go for it with your whole heart and soul—don't make excuses to yourself and brood over what a success you would have made of something else. The probability is that people who make a success of one job would make a reasonable success of any other job ; and that the failures in any one job would be failures in most other jobs. It is not universally true, of course, but it is almost universally true.

If, after you have been in a job for some time you come to the conclusion that you will always hate it, then get out of it at the earliest opportunity ; let there be as little delay as possible. The older you are, the more difficult it is to begin again.

Your job.—Many of you have already made a start in the great big world, and are earning at least a part of your own living. What is your attitude to your employer and to your job ?

Since you are a free agent and not a slave, you are bound to accept the authority of your employer in so far as it relates to your job. If you are not prepared to do this, your only proper course is to give up the job and seek another. While you are in a job, it is up to you to accept your employer's orders and decisions with as good a spirit as you accept his money. You are normally bound also to put your back into the job, and not to "dodge," or

'malinger. You would be highly indignant if he attempted to fob you off with counterfeit money, or to pay you less than your agreed wage. He is entitled to be just as indignant if you give him less than your best.

Your employer's interests must be your own: you must be prepared to give up just so much of your liberty as is necessary in order to further his interests. He is entitled to expect that your "turn-out," your behaviour, and your manners shall be such that his business does not suffer; and he is entitled to expect that you will turn up punctually and in a fit condition to do an honest day's work.

Of course there are bad employers as well as good ones; but if you have a bad one your remedy is to change him at the first possible opportunity, and not to cheat him of what he is entitled to while you still remain in his service. There is more in this than just a fair deal for the employer; your own efficiency suffers, and your development is retarded, if you form the habit of not pulling your weight. It is not so easy to turn over a new leaf as you might imagine.

Continued education.—Only a minority of jobs nowadays provide you with full opportunities of gaining knowledge of the whole business in which you are engaged. There is more and more specialisation and more and more of mass production methods, so that you are apt to become expert in your own tiny little corner of the whole concern, and to know little about the rest of it. There is everything to be said for attending evening classes or taking correspondence courses. Almost certainly, some time or another, there will occur an opportunity for promotion to a better job, which requires a wider knowledge than your actual work gives you. If you have had the foresight to equip yourself with that knowledge, you are eligible. Then again, many firms have their own special ways of doing things; your experience is of value while you are with that firm, but if for any reason you have to make a change, you may find that your special knowledge is of little value to other firms. There is everything to be said for gaining as wide a knowledge as possible of your own line.

If you have left school early your general education is certainly very far from finished ; and quite apart from any possible business value, it is worth while for the sake of your own development to continue it. It is wisest to have no break, but to take some classes as soon as you leave day school. If you leave a long gap, you will find to your horror that you have forgotten a great deal of what you once knew, so that you have to spend a year or more in regaining the standard you had formerly reached.

Whole-time adolescent education.—If your whole time is still devoted to your education the date of your entry into the great struggle is still somewhere in the future, and the immediate direction of your efforts is still determined for you. You are, or should be, more fortunate than those who have made an earlier start, since your preparation will be more thorough and more complete, and you have more time to discover your tastes and gifts and more opportunity of deciding what career will give you most scope.

Against this must be set the disadvantage that you are continuing to live in a very small world at a time when others of your age are gaining valuable experience of the world outside : you are still very much within "the four walls." You can lessen this handicap if you recognise its existence, and see the importance of getting right outside your little world and your little circle whenever you can.

I hope to see in the future clubs modelled on the Rotarian pattern, and open to adolescents. Not more than half a dozen from any particular "line" would be admitted, so that there would be some young members from schools and colleges, some from offices, and some from workshops, while the older members would be representative of all the professions, of commerce, and of "labour." Until such clubs come into existence, you will be wise to mix as freely as possible with outsiders, and to take full advantage of your long holidays to get right away from term-time associations.

Hero-worship.—Those who are *in statu pupillari* are peculiarly prone to hero-worship. Hero-worship is normal and sound during childhood and early adolescence ;

but it is a thing that should be left behind at the proper stage of mental growth. It is often quite a shock to meet the heroes of one's early years when one has been out in the world for some time. They seem to have become infinitesimally small, but, as a matter of fact, they are exactly the same as they used to be, or may even have improved with riper maturity: the shock is due to the altogether exalted opinion which we once had, but have no longer.

It is but right to have respect and admiration for outstanding ability in any direction, but it is utterly unsound to endow the possessor of such ability with all-round super-excellence: an individual may be quite a star in his own particular line, but may be little better than a child when he is taken "off his beat." Keep a clear distinction between a quality and its possessor—and get out into the world as much as possible. During your later teens you should be busy forming your opinions and provisional judgments, subjecting everything to criticism, weighing in the balance ideas and persons. It is of vital importance that your powers of observation, of criticism, and of judgment should be clear and unclouded, uninfluenced by bias or obsession of any sort; and hero-worship is quite definitely a bias.

Ambition.—You have no doubt been urged to "Hitch your waggon to a star," and you have been fed upon stories of the boys who started to work in rags at the age of six, and became captains of industry, prime ministers, or other great folk. You may even have begun to suspect that rags and want of schooling are the essential ingredients for startling success. I cannot help feeling that this sort of thing is overdone.

If you really have outstanding abilities and if material success is the one thing that you value, then by all means aim really high; but if you are differently constituted, I doubt the wisdom of torturing yourself by the pursuit of the unattainable.

Some measure of material success should be included among every one's aims. "Love in a cottage" is almost invariably a myth, and the man who doesn't value money

is usually a bit of a fool. If you are going to enjoy life you must ensure a reasonable standard of creature comforts ; and your material needs will grow as you become older, especially when you have children.

An honest stocktaking of your abilities, and a careful consideration of what you can do with them, is never amiss. Aim too high rather than too low, and remember that your standard of values will alter as you grow older. You do not want to spend thirty years cursing yourself for having thrown away in youth the prospects of your later life.

Loneliness.—Man is essentially a gregarious animal : he needs the society of his fellows. One strong argument in favour of marriage and a family is that it supplies this need in a way that nothing else can.

The great time for making enduring friendships is later youth and the years immediately following : it becomes increasingly difficult as one becomes older.

I think that it is worth while to consider whether it is wise to take unto yourself one "bosom pal." A very close friendship is apt to be exclusive, and to prevent you from building up a wide and satisfying circle of friends and acquaintances. Your development is limited and retarded, for full development comes by the interchange of ideas and the rubbing of many shoulders : then later on your crony goes off and marries, and leaves you very much high and dry. Exclusive friendships are best avoided.

A small circle is almost as cramping as a bosom friend. There is everything to be said for being a member of several circles, and for letting these circles be as different as possible from one another. It would be ideal if every one could be a member of half a dozen clubs, each one of a different type, so that he (or she, of course) could meet many people in different walks of life, with different experiences and views. This would afford splendid opportunities for the selection of the favoured individuals who were to form the more intimate circle. If you really determine to have a wide circle, you can manage it well enough in the large towns where you have the choice of the various institutions connected with the church, athletic, social and

political clubs, choral, dramatic, and "learned" societies, literary circles, and various "movements."

Money matters.—Saving money is a habit, and it is a habit that should be formed early in life. As soon as ever you begin to earn money, you will be wise to put aside something every time you receive your wages or salary. In the early years, when your margin may be narrow, the actual amounts will necessarily be small; but the habit becomes formed, and it is the habit that is important.

I believe that it is worth while, as soon as ever you are in command of regular earnings, to make out a balance sheet. Your daily and weekly expenses are a necessary deduction from the total money at your disposal. Some items, such as clothes and holidays, require comparatively big sums at intervals: these should be met from a fund into which you pay something every time you receive your wages. The residue is your "free" money. A reasonable proportion of this should be put aside regularly for emergencies and for savings proper; and I suggest that this fund should never be drawn upon in any ordinary circumstances.

I know that this advice will be unpopular. I know equally well that it is the advice you will give to your own youngsters when they go out into the world; and I know too that you will regret it if you yourself do not act upon the advice.

There is, surely, something lacking—if not something actually despicable—about any one who make no provision for emergencies, such as a period of illness or of unemployment, when he is in a position to do so. It means that he proposes, in an emergency, to collapse upon his relatives and friends. He proposes to eat the whole of his cake, and then beg some of theirs. This, I feel, is a sufficient justification for the emergency fund, though I could put forward other justifications too.

With regard to the savings proper, as apart from the emergency fund—some time or other you will need (or want) to buy something which costs a fair amount. If you haven't saved, you either have to go without, or else to buy on the instalment plan. It is not possible to say just

what you lose by buying in this way : some firms state that they add only 5 per cent. to the ready-money article ; some imply that they add nothing ; but I wonder what percentage they would really knock off their marked prices for " cash down " ? Some time ago I took the trouble to work out the figures for buying a car on the instalment plan. It came to this—the purchaser was borrowing the money to pay for the car, and paying well over 14 per cent. Is this sound business ?

Recreation.—I am dealing with recreation now, not in its common meaning (amusement), but in its more limited meaning *re-creation*—a total refreshing of the mind and body.

There are in all of us impulses which are real *needs* of the soul, and which are not satisfied in our ordinary working hours, or even by our sports. One man is possessed of a desire to collect, another of a yearning to construct ; others feel a real need at times to escape from the trammels of everyday life by losing themselves in the realms of music, or poetry, or in tales of travel or adventure. If there is within you any such need which is totally unsatisfied, you suffer.

Sport, of course, is one form of recreation, and while you are letting off all your spare steam in sport, you may hardly notice that you are neglecting to satisfy these other needs. I want, therefore, to warn you against the total neglect of these needs, through your devotion either to the main chance or to sport.

These urges or impulses, when they are left unsatisfied, have something in common with those buried complexes which may do you harm. They "work" within you. Unfortunately, after years of neglect the inclination to satisfy the need may disappear. You may lose the taste for collecting, or the skill and energy to construct, or you may become too restless to enjoy music or reading, but the *need* may still be there within you.

Let us take a hypothetical case. X. has within him a strong constructive urge. He may not have noticed this particularly when he was at school—he was just good at carpentry as he was at other things. He certainly did not

recognise that he had a *need* to construct. He went into some clerical job because of its material prospects. For years he devoted himself heart and soul to his career and spent his scanty spare time in tennis or some other sport. All this time he was too busy to think much about himself. The years have rolled on and he has now reached the stage in his career when success gives him somewhat more freedom : he has, meanwhile, become increasingly conscious that there is *something* lacking, although apparently everything has been going well with him. It comes to him at last—probably by accident—that he wants to construct, *needs* to construct, to make things. He finds, however, that through long neglect to use tools his fingers are all thumbs, and that his efforts would be no credit to a boy of twelve. If he happens to be wise, he swallows his pride and begins at the beginning, and trains himself in the use of tools. More probably he throws down his tools in disgust, and gives up the idea of making things. If he takes the latter course, almost certainly that unsatisfied need will continue to afflict him and he will find it difficult to become *quite* completely happy and content.

Most probably you have some such needs within you ; and if so, it is wise to discover them and keep them alive at least. Do not neglect them until you have become such a creature of habit that anything new is irksome to you.

I have said that if you harbour within you totally unsatisfied urges you may suffer ; but this is not my only reason for recommending you to have some recreational interests or hobbies. The time will come when you will devote yourself less to active sport, and, later on, when you retire. How often do we see a successful man die—through sheer boredom—within a few years of retiring ! The man who has hobbies does not die of boredom—the evening of his life is perhaps the most mellow and contented period of all.

If you are not conscious of being drawn towards any hobbies, I suggest that you would be wise to look into one or two that appear as though they might become attractive to you. Knowledge of anything has a most surprising way of increasing interest. You may find a whole world of

unsuspected delight in some hobby which appeared to be utterly dull before you knew anything about it.

Let me give you an example from my own personal experience. Some time after I had passed my teens I met an entomologist. I recognised almost immediately that butterflies and moths were to me intensely interesting. I had, up to this point, hardly recognised their existence, although I had lived for years near the most famous "bug-hunting" centre in this country. Now, for more years than I care to remember, bug-hunting has been a source of increasing interest and pleasure. The whole countryside is peopled for me.

During my wanderings with the net, I must have met nearly a hundred people who have been shyly anxious to look at my "bag," and have confessed to a real sense of loss because their lack of knowledge prevents them from getting the pleasure they might get from their wanderings in the country. I have many times been asked for the name of a book which will make it possible to begin collecting. Quite a number of people have regretted that they fear that they have left it too late to begin. I have met quite a few parents, collecting with their sons, who have confided to me that they themselves are actually much keener on the collecting than the sons whom they are pretending merely to help!

Now I do not suggest that you should dash out and buy a net: bug-hunting might not appeal to you. I have given you my personal experience as evidence that you may well be missing a great deal of pleasure in life if you do not discover *some* recreational interest.

I do not think that it matters what hobby you have, so long as it appeals strongly to *you*; but there is a great deal to be said to having recreational interests which are a complete change from your work interests. A busman's holiday is not the best form of holiday.

I do feel, however, that I should put in a word for reading as one of your recreations—not just the reading of newspapers and periodicals, nor even the reading of books from libraries. You may well begin early to form your own library. If you have a good library of your own, you

have at your elbow a friend for every mood, a friend who never bores you or outstays his welcome. Book-collecting on a modest scale need not be expensive : if you are something of a handy man, or if you take a course of book-binding (which, by the way, is perfectly simple and inexpensive, and can be learnt at evening classes in a single winter), you can pick up many tattered treasures for a few pence each, and either doctor them up or re-bind them ; and you can also indulge in the joys of rummaging in the second-hand bookshops for bargains, which is itself quite a thrilling hobby if you are built that way.

As a final word in favour of recreational interests, it must not be overlooked that some at least of them bring you into contact with people whom you would not otherwise meet, and provide you with one extra circle of acquaintances—a benefit which should not be underrated.

Attitude to parents.—Parents bulk large as “ authority,” particularly during the years of early childhood, and in discussing your attitude to authority they have been included to some extent ; but we must go into the matter a little more deeply. It is a matter of common observation that parents and children often fail to “ hit it off well ” and that each blames the other for the lack of harmony and proper feeling. I must choose my words carefully, for I do not wish to be used as ammunition in family disputes ; but this question must be faced as honestly as other questions have been.

I must say straight away that I think that in the past far too much emphasis was laid upon the duty of children to parents. I can hardly be accused of bias, since I have been a child and am now a parent ; but I have never been able to get away from this point—children are brought into the world with no reference to their wishes upon the subject, and they are unable to exercise any choice of parents. Children don’t just happen—or at least, they should not : to bring a child into the world is far, far too serious a matter to be undertaken lightly. The child’s heredity is a matter over which the child has no control : he is the joint product of his parents, and his equipment of qualities and potentialities is their gift. The parents,

too, provide by far the greatest and most important part of the child's environment during the period when environmental influences have their strongest effects upon his development. Parents, then, are wholly responsible for their child's existence, for his heredity, and for what is possibly the most important part of his environment.

Now that I have said all this, please do not proceed to blame your parents for all your shortcomings. I have only just begun.

Parents make mistakes. *Of course* they do—you will when you are parents ; but I trust that your mistakes will be fewer and less serious, for you will have far less excuse. In your parents' time it had hardly begun to be recognised that producing a child was a matter for deep consideration : heredity was a closed book to all except a few scientists, and nearly every one held that people who could provide for a child's creature needs were fully justified in having a child, even if they had not a bounden duty to do so. If you leave out the really bad parents, you will be safe in thinking that nine-tenths of the errors have been due to ignorance in matters wherein all but the few were ignorant, and you must therefore give your parents credit for the good intentions. You must also take into account that parents have their patches of ill-health and worry, when they are not able to do all that they would wish to do.

Reflect upon a few of the possible errors. Too harsh discipline, predisposing you towards a wrong attitude to authority ; too little discipline, as a result of which you have failed to develop self-control and are due to be kicked hard and often by the world ; making too much of you, so that you cannot work with the team and are cursed with conceit ; making too little of you, so that you have an inferiority complex ; protecting you too much, so that you lack courage and self-reliance ; protecting you too little, so that you struck snags before you had reached the stage of development when you were fit to cope with them , too much coddling, so that you have not the immunity that you should have ; too little care, so that you have weaknesses that might have been avoided ; and so on. You will see that all the way through there is the need for

striking the happy medium, and that parents have had to try to do this without much experience or training to guide them. There is no wonder that mistakes are made : the wonder is that there are not more of them. If there have been errors which you yourself can now recognise, you cannot be surprised. In any case, it is no use crying over spilt milk, or brooding over the past. Nothing that has happened provides you with any excuse for not taking hold of things yourself, and putting them right now to the best of your ability.

I do not think that parents are under any moral obligation to cripple themselves financially in order to give their children a flying start in life. I think that they should give them a reasonably good start in life, according to their means ; but I think that their duty stops short there. If your parents have done more, then I think that they have put you under some obligation, and that you should feel that you want to make up to them to a reasonable extent. I set some limits to this, as you will see later ; but if you have within you any decency, you will feel real gratitude and you will wish to show it. Where parents have done a great deal for their children simply as a means of self-glorification (*as some parents do*) then I do not see that any obligation exists. It is all a question of the real motive : if your parents have made sacrifices which had your benefit as their sole object they are entitled to all credit—but only in these cases.

I have said that I set limits to the moral claim that even the best parents have upon their children. It is not at all unusual for parents to press their claims altogether too far : the daughter must give up thoughts of a career or of marriage and devote her life to being cook-housekeeper-nurse to her parents ; the youth whose whole soul cries for a wide adventurous life must stay at home and take some job that he loathes, because his parents cannot bear to part with him. Such parents do, in effect, demand that their children shall be human sacrifices. The last stage of parents' duty is to retire into the background and to let loose their children to lead their own lives. Those who cannot do this with a good spirit are not worthy of parenthood.

Average parents have played the game to the best of their ability ; and it is for you to play the game with them in return—not to the extent of making a sacrifice of yourself, of course ; but you must play the game. While you live at home, it is up to you not to make the home uncomfortable for them : they are getting on in years, you know, and perhaps they cannot stand noise and excitement and late hours as you can. It is their home, and they have to live in it ; even if it cramps your style a bit, you must see to it that their home is not spoilt for them.

I think, too, that you should show, in your manners, some respect towards them ; failure to do so lets them down. There is no loss of dignity or need be no loss of proper independence : it is just a question of decent manners. Your parents are entitled to something more than politeness, to my mind. You are rather called upon to fall in with their wishes wherever it is possible to do so without interfering unduly with your own development towards complete individuality and independence. There must be give and take, of course, but you do no harm by putting some emphasis on the "give."

With the best of intentions on both sides, there are apt to be very real differences of opinion. Now these differences need not lead to any "atmosphere," if each will take into consideration that a thing is not the *same thing* to young people and to older people. Let us take a simple example. Perhaps at this moment the most important thing in the world to you is to get your colours ; to your father, who will be delighted if you do get your colours, the examination that is a month ahead is far more important. Your father, unless he has very vivid recollections of his own youth, and was very much like you in disposition, may be quite unable to recognise that getting the colours is really the most important thing in the world to you : he has never been in exactly the same position. On the other hand, he may have been in precisely the same position, and he may, in looking back over his life, know that he sacrificed solid and lasting advantages for the sake of a temporary triumph. Here we see two possible alternative explanations of his inability—which is not a wilful and

perverse refusal—to look at things in exactly the same way as you look at them.

This simple example gives us the two commonest causes of failure to see eye to eye—a totally different sense of values, and a difference in experience, in length of view. This may not appear to help very much in getting over the difficulty; but, as a matter of fact, it always does help if each can see the other's point of view and give it respectful consideration. But suppose that we get as far as this, and still fail to manage to reach complete accord. I am going to suggest that usually father's view is the sounder, at least until you are getting towards the end of your teens. But by the time you are nearing twenty, the point becomes more doubtful: it depends so much on father and on you. When you are in doubt, back father.

You will find that older people usually tend to take a long and material view, while younger people tend to take a shorter and more emotional view.

It makes things extremely difficult if father (or mother) "does the heavy" too much, and fails to give the developing children more and more rein. It should be one of the objects of parents to exercise a gradually decreasing control, so that by the time the youngster is capable of forming reasonable decisions he has formed the habit of doing so. It should be a further object so to manage things that the youngster turns naturally and confidently to his parents for advice and discussion and sympathy *on any and every point*. It should be possible for parents and children to discuss even questions of authority and questions of sex, as well as other points.

I have said that the affection of parents is stronger than the affection of children, and my last words to you shall be upon this point. You cannot, until you have children, even remotely comprehend the real heart-hunger that parents have, and not until you have children of your own will you be able fully to understand your parents' feelings towards you. Try to bear this in mind.

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